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September 1995

U.S. Department of the Interior
Bureau of Land Management

Coos Bay District
1300 Airport Lane
North Bend, Oregon 97459

and

the Confederated Tribes of
Coos, Lower Umpqua
and Siuslaw Indians

prepared by
SRI/SHAPIRO, Inc.

Draft

Environmental Impact Statement for the Bal'diyaka Interpretive Center

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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DRAFT

Environmental Impact Statement for the Bal'diyaka Interpretive Center at Gregory Point on the Oregon Coast in Coos County

Prepared for: Lead Federal Agency
United States Department of the Interior
Bureau of Land Management
Coos Bay District
1300 Airport Lane
North Bend OR 97459-2000 (503) 756-0100
Signing authority: Elaine Zillinski - State Director

And

Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians

Cooperating Agencies:
US Department of Transportation - US Coast Guard
Oregon State Parks and Recreation Department
Oregon Department of Fish and Wildlife
Oregon Department of Land Conservation and Development

Abstract:

The Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, in partnership with the Coos Bay District of the Bureau of Land Management (BLM) are proposing to construct and operate an interpretive center near or on the South Coast of Oregon, near Coos Bay. The Bal'diyaka Interpretive Center is envisioned to contain a 51,000 square foot main building, a recreated coastal Indian village, an ethnobotanical interpretive trail, vehicular circulation and parking, and utilities infrastructure.

This Environmental Impact Statement analyzes four alternatives for this proposed interpretive center.

The proposed action of the BLM would locate the Bal'diyaka Interpretive Center on Gregory Point, which is an approximately 30-acre headland area north of Sunset Bay, west of Cape Arago Highway and south of Lighthouse Way.

Alternative #1, the Yoakam Point site, is approximately 25 acres and is located 0.5 mile north of the Gregory Point site, along the Cape Arago Highway. The site is bounded by Cape Arago Highway to the south, the Pacific Ocean to the north, private residences to the west and Bastendorff Beach to the east.

Alternative #2, the Coos Head site, is located approximately 1.5 miles east of the Gregory Point site, off the Cape Arago Highway. The site is approximately 25 acres and is bounded by Bastendorff Beach to the north and west, the U.S. Air Force facility at Coos Head to the east, and private residences to the south.

In addition to the proposed action and two alternatives described above, a No Action Alternative was considered.

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This EIS is intended to fulfill other environmental review requirements such as the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.), and other environmental review laws and Executive Orders. The review and consultation requirements of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) require the preparation of a separate Biological Assessment to be reviewed by the US Fish and Wildlife Service.

Issued: October 6, 1995

Comments must be received by: December 6, 1995

Note: This document was prepared by professional consultants under contract to The Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians through Economic Development Administration Adjustment Strategy Grant Number 07-29-03468. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the contractor and do not necessarily reflect the views of the Economic Development Administration.

Additional resources for the completion of this report were made possible through the Coos Curry Development Corporation, Regional Strategies Board and the Oregon Economic Development Department, Lottery Funding.

EXECUTIVE SUMMARY

DESCRIPTION OF PROJECT

The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, in partnership with the Coos Bay District of the Bureau of Land Management (BLM) are proposing to construct and operate an interpretive center on the south coast of Oregon, near Coos Bay. The proposed Bal'diyaka Interpretive Center would provide a multi-faceted heritage tourism facility. The center would interpret the natural history of Oregon's southern coast; the cultural heritage of the Coos, Lower Umpqua, and Siuslaw Indians; and the history of local U.S. Coast Guard activities. As many as 266,000 people per year are expected to visit the center, which would generate economic benefits to the community.

PURPOSE AND NEED

The purpose of the proposed action is to construct and operate an interpretive center that presents the following: the natural history of Oregon's southern coast; the cultural heritage of the Coos, Lower Umpqua, and Siuslaw Indians; and local U.S. Coast Guard history.

The need for the proposed action is to provide historic accuracy and authenticity, preserve and restore tribal culture, satisfy the demands for heritage tourism and eco-tourism, deliver a high quality education and recreation experience, and develop economic opportunities for the community.

PROPOSED ACTION (BLM PREFERRED ALTERNATIVE)

The Preferred Alternative is to construct the proposed interpretive center at Gregory Point, on the south coast of Oregon, near Coos Bay. This site was chosen because of its historical significance to the Confederated Tribes (it contains an ancient Coos Tribe village and an area reserved as a tribal cemetery) and its location in relation to the existing Cape Arago Lighthouse and former U.S. Life-Saving Service Station. The proposed Bal'diyaka Interpretive Center would be located on the approximately 30-acre headland area north of Sunset Bay, west of Cape Arago Highway, and south of Lighthouse Way.

The interpretive center would contain the following elements:

- A 51,000-square-foot interpretive center building;
- A recreated coastal Indian village;
- An ethnobotanical interpretive trail;
- Vehicular circulation and parking; and
- Utilities and infrastructure.

The interpretive center building, while not yet designed, is envisioned as a low-profile structure (a maximum of two stories) constructed of indigenous materials (native wood and stone). The building would integrate the environment into the structure and is envisioned to have an asymmetrical floor plan; a broad, overhanging, low-pitched roof; and large windows.

The interpretive center building would contain the following functions and areas: orientation, lobby, and public areas (2,600 square feet); gift shop (1,000 square feet); permanent exhibit galleries (14, 000 square feet); temporary exhibit gallery (2,500 square feet); multi-use auditorium (5,000 square feet); administration (2,125 square feet); curation and collections (4,250 square feet); ancillary services areas (4,450 square feet); and lighthouse/observation tower (new; 1,200 square feet). Total net area would be 37,125 square feet, with a gross area of 50,912 square feet.

A new Cape Arago lighthouse and observation tower, in addition to the existing lighthouse on Chief's Island (which would be maintained as an historic landmark), would be part of the interpretive center. The interpretive center would have a recreated Indian village and an ethnobotany trail as outdoor exhibits. The village would contain traditional cedar-planked structures, including a ceremonial house, a dwelling, a children's sleeping house, a sweathouse, a drying house, a woodshed, a windbreak, and a gravehouse. The ethnobotany trail would traverse the site, adjacent to the natural plant communities.

Access to the interpretive center is envisioned to be provided by pedestrian and bicycle pathways, as well as a vehicular approach. Pedestrian access would be along trails from the beach at Sunset Bay and the Sunset Bay State Park campground. Bicycle lanes would be provided along the internal road system at the interpretive center, and adequate bicycle parking would be provided. The vehicular approach to the interpretive center would be along the Cape Arago Highway. Public parking for approximately 130 passenger cars and 50 recreational vehicles would be provided close to the interpretive center building. Bus parking for schools and tour groups would be at the State Parks maintenance yard east of Gregory Point across the Cape Arago Highway.

ALTERNATIVES CONSIDERED IN DETAIL

Two alternative sites, Yoakam Point and Coos Head, are considered in detail in this EIS. Alternative #1, the Yoakam Point site, is approximately 25 acres and is located 0.5 mile north of the Gregory Point site, along the Cape Arago Highway. The site is bounded by Cape Arago Highway to the south, the Pacific Ocean to the north, private residences to the west and Bastendorff Beach to the east. All of the interpretive center elements described for the Preferred Alternative, except for use of the existing lighthouse, pedestrian access from Sunset Bay, and improvements to Lighthouse Way, would be incorporated at Yoakam Point. Bus parking for schools and tour groups would be off-site at an existing parking lot in Charleston.

Alternative #2, the Coos Head site, is located approximately 1.5 miles east of the Gregory Point site, off the Cape Arago Highway. The site is approximately 25 acres and is bounded by Bastendorff Beach to the north and west, the U.S. Air Force facility at Coos Head to the east, and private residences to the south. As with the Yoakam Point site, the Coos Head site would incorporate all of the interpretive center elements described for the Preferred Alternative, except for the existing lighthouse, pedestrian access from Sunset Bay, and improvements to Lighthouse Way; bus parking would be off-site at an existing parking lot in Charleston. In addition, pedestrian access would be provided from Bastendorff Beach Park.

In addition to the proposed action and two alternatives described above, a No Action Alternative was considered. In this alternative, none of the elements discussed for the Preferred Alternative would be implemented and the three sites would remain in their existing conditions.

SUMMARY AND COMPARISON OF POTENTIAL IMPACTS

A comparison of potential impacts relative to the No Action Alternative is included below and summarized in Table S-1.

Geology

Potential impacts of the interpretive center on geology are minor to moderate at all of the alternative sites, but may be greater at Gregory Point and Yoakam Point. Because these two sites are subject to wave erosional forces, changes to vegetation near the bluff line (due to visitors going off the trails and near the edge of the headland) may lead to increased erosion and sloughing of the headland in comparison to the Coos Head and No Action alternatives.

Soils

Potential impacts due to soil erosion are minor to moderate at all the sites. However, because of the presence of several water features on the Coos Head site, construction of the interpretive center may lead to increased soil erosion in comparison to the Gregory Point, Yoakam Point and No Action alternatives. All sites have the potential of windthrows. The No Action Alternative would not result in any effect on soils.

Groundwater

Potential impacts on groundwater by construction or use of the interpretive center are minor at all the sites. The No Action Alternative would not result in any effect on groundwater.

Table S–1. Comparison of Impacts

Element	Proposed Action	Alternative		
		Yoakam Point	Coos Head	No Action
Geology	–3	–3	–2	0
Soils:				
Erosion Potential	–2	–2	–3	0
Windthrow	–2	–2	–2	0
Ground Water	–1	–1	–1	0
Surface Water	–1	–1	–2	0
Vegetation	–3	–2	–2	0
Wildlife:				
Habitat	–2	–2	–3	0
RTE Species	–2	–2	–1	0
Wetlands	–1	–1	–2	0
Aquatic Ecology	–2	–2	–1	0
Air Quality	–1	–1	–1	0
Cultural Resource	–3	–2	–1	0
Paleontological	–2	–2	–1	0
Social and Economic Values	+3	+3	+3	0
Land Use:				
Adjacent Land Use	–1	–1	–1	0
Change in Existing Land Use	–1	–2	–2	0
Recreation:				
Opportunity	+2	+2	+2	0
Use of Existing Facilities	–1	–1	–1	0
Visual	–1	–2	–3	0
Infrastructure	–2	–2	–1	0
Access	–1	–1	–2	0
Noise	–1	–1	–1	0
Hazardous Materials	–2	–1	–1	0

Level of Impact = 0–5
0 = No Impact
5 = Highest Impact
– = Adverse Impact
+ = Positive Impact

Surface Water

Potential impacts due to soil erosion are minor at all the sites. However, because of the presence of several water features on the Coos Head site, construction of the interpretive center may lead to increased soil erosion and runoff of construction machinery pollutants in comparison to the Gregory Point, Yoakam Point, and No Action alternatives. The No Action Alternative would not result in any effect on surface water.

Vegetation

Potential impacts on vegetation are similar for all the alternatives. However, a greater proportion of forest exhibiting old growth characteristics would be affected on Gregory Point. Approximately five acres of forest would be cleared for construction of the interpretive center on any of the sites. The No Action Alternative would not result in any effect on vegetation.

Wildlife

While the area of vegetative disturbance is approximately the same at all the sites, the disturbance to habitat due to fragmentation varies. Because of the relative size and placement of the interpretive center on the sites, the potential impact on habitat is most severe at the Coos Head site and least severe at the Gregory Point site. Potential impacts on rare, threatened or endangered species known to use the sites are minimal to moderate at all the sites, depending on species, and are primarily related to direct and/or indirect disturbance. Potential impacts on rare, threatened or endangered species for which suitable habitat is present, but has not been observed on the sites, range from minimal to high, depending on the species. The probability of these species actually using the sites is unknown. The No Action Alternative would not result in any effect on wildlife.

Wetlands

Direct filling of wetlands would not occur on any of the sites, including the No Action Alternative. Potential for indirect impacts is higher at the Coos Head site, because it contains water features, which may receive sediments during construction. Indirect impacts on wetlands on Gregory Point are possible, although these would be minor due to the wetland's small size and the relatively level topography of the site.

Aquatic Ecology

Potential impacts on aquatic ecosystems in the vicinity of all the sites are minor, but may be greater at Gregory Point and Yoakam Point. The rocky intertidal shores of these two sites are more sensitive to trampling than the sandy shores near Coos Head. The No Action alternative would not result in any effect on aquatic ecosystems of the region.

Air Quality

Potential impacts due to air quality are minor at all the sites. The No Action Alternative would not result in any effect on air quality.

Cultural Resources

Potential impacts on archaeological and historical resources by vandalism or trampling are greatest at Gregory Point, because of the presence of resources at or near the site. Yoakam Point also has a cultural resources presence and the use of the interpretive center may affect those resources. Coos Head has no known cultural resources and use of the site would result in minor potential impact. The No Action Alternative would not result in any effect on cultural resources of the region.

Paleontological Resources

Potential impacts on paleontological resources by construction or use of the interpretive center are minor at all the sites, but may be greater at Gregory Point and Yoakam Point. These two sites are subject to more erosion, which may expose fossil resources to visitors. The No Action Alternative would not result in any effect on paleontological resources.

Social and Economic Values

Construction and use of the interpretive center would have the same positive economic effect, regardless of the site selected. The interpretive center would increase tourism in the region and provide long-term, on-site employment opportunities compared to the No Action Alternative.

Land Use

Potential impacts on land use are minor at all the sites. Adjacent recreational and residential land uses would be affected at all the sites to the extent that the proposed use represents an increase in intensity from the existing use. However, the facilities would not be visible from adjacent areas because of buffering provided by heavy forest cover. Change in existing use would be less at the Gregory Point site than at either Yoakam Point or Coos Head, because the site already is partially developed with U.S. Coast Guard facilities. The No Action Alternative would not result in any effect on land use.

Recreation

Potential impact on recreational opportunity is expected to be positive at all the sites, because a new facility would be available as a tourist attraction. However, increased tourism resulting from the interpretive center likely would result in increased use of surrounding facilities, some of which are at or near capacity. This impact on nearby facilities is considered negative, because increased use potentially would not be accommodated at certain times of year. The No Action Alternative would not result in any effect on recreation.

Visual Resources

Potential impacts on visual resources are minor for all the sites; however, because the project would be most visible at the Coos Head site, it would be most affected. At all the sites, the most prominent visual feature would be the proposed observation tower, which would be visible above the tree line. At both the Yoakam Point and Coos Head sites, the interpretive center also would be visible from certain locations. The project would not be visible from Cape Arago Highway at any of the sites. The visual contrast rating for vegetative and structural changes at all three sites is considered either weak, weak to moderate, or moderate. The No Action Alternative would not result in any effect on visual resources.

Infrastructure

Impacts on infrastructure are minor for all sites. In general, water, telephone, electric and sewer service would need to be extended to all the sites, or existing lines would need to be upgraded. Gregory Point and Yoakam Point currently have more limited access to utilities than the Coos Head site, because the area surrounding it is more developed. The No Action Alternative would not result in any effect on infrastructure.

Access

Both the Gregory Point and Yoakam Point sites have direct access from Cape Arago Highway; access to the Coos Head site is via Coos Head Road. The primary difference in impact between the alternatives is due to existing background traffic volumes. At the Gregory Point and Yoakam Point sites, the increase in daily traffic is expected to be between 75 and 140%, and the level of service would remain the same. Whereas, the increase in daily traffic at the Coos Head site would be between 40 and 75%, but the level of service would decrease from A to B. No traffic operations impacts requiring intersection or highway mitigation are expected at any of the sites. The No Action Alternative would not result in any effect on access.

Noise

Construction noise would occur at all the sites; however, this impact would be minor and of limited duration. General background noise associated with the new interpretive center also would increase once it is completed. The largest noise level increase at all the sites would likely be related to increased vehicle trips and parking lot activity. The No Action Alternative would not result in any effect on noise.

Hazardous Materials

Potential impacts from hazardous materials are minor at all the sites. Impacts would be slightly higher at the Gregory Point site because removal of an underground storage tank, demolition of housing units, and potential removal of a water line would be necessary. The No Action Alternative would not result in any effect on hazardous materials.

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Section 1.0

Introduction

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND HISTORY

1.1.1 DESCRIPTION OF PROJECT

The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, in partnership with the Coos Bay District of the Bureau of Land Management (BLM) are proposing to construct and operate an interpretive center on the south coast of Oregon, near Coos Bay. The proposed Bal'diyaka Interpretive Center would provide a multi-faceted heritage tourism facility. The center would interpret the natural history of Oregon's southern coast; the cultural heritage of the Coos, Lower Umpqua, and Siuslaw Indians; and the history of local U.S. Coast Guard activities.

The interpretive center, as envisioned, would contain the following elements:

- A 51,000-square-foot building housing permanent galleries, interactive exhibits, a 300-seat auditorium, and a gift shop;
- A recreated coastal Indian village;
- An ethnobotanical interpretive trail;
- Vehicular circulation and parking; and
- Utilities and infrastructure.

The proposed interpretive center is expected to be visited by as many as 266,000 people per year and would generate economic benefits to the community.

1.1.2 HISTORY OF PROJECT

In 1989, Confederated Tribes' former representatives (Chief Bill Brainard and Tribal Administrator Joseph Miller) discussed the interpretive center concept and possible locations with U.S. Senator Mark Hatfield (Oregon) and representatives of Senators Bob Packwood (Oregon) and Daniel Inouye (Hawaii), as well as Congressman Peter DeFazio (Oregon). In 1990, the Confederated Tribes were awarded a grant from the National Endowment for the Humanities for cultural studies.

In 1991, the Confederated Tribes met with representatives of the U.S. Coast Guard, BLM, U.S. Forest Service, National Park Service, Oregon Parks and Recreation Department, and the Governor of Oregon to discuss the interpretive center. The Tribal Council unanimously voted in that year to invite the BLM to be their lead federal partner for a joint venture of a Tribal/Federal interpretive center. In August 1991, the BLM became involved in the interpretive center project.

In 1991 and 1992 a master plan for the interpretive center was developed. The master plan process included four phases:

- Phase I - Program Definition and Research
- Phase II - Development of Project Scope, Vision, and Design Concepts

- Phase III - Facility Recommendations
- Phase IV - Master Plan Publication

During the master planning process, the Confederated Tribes and the BLM formed two groups: the Executive Committee, comprised of the BLM, Confederated Tribes, U.S. Coast Guard, and, initially, Oregon Parks and Recreation Department; and the Technical Advisory Committee, comprised of representatives of the Confederated Tribes, BLM, U.S. Coast Guard, Bureau of Indian Affairs, U.S. Forest Service, Oregon Parks and Recreation Department, Oregon Institute of Marine Biology, U.S. Fish and Wildlife Service, Bay Area Chamber of Commerce, Coos Art Museum, U.S. Senators and Congressman, and private citizens.

In 1992 the master plan for the Bal'diyaka Interpretive Center at Gregory Point was published. This plan recommended that an Environmental Impact Statement (EIS) be prepared for the proposed project. This document is that EIS.

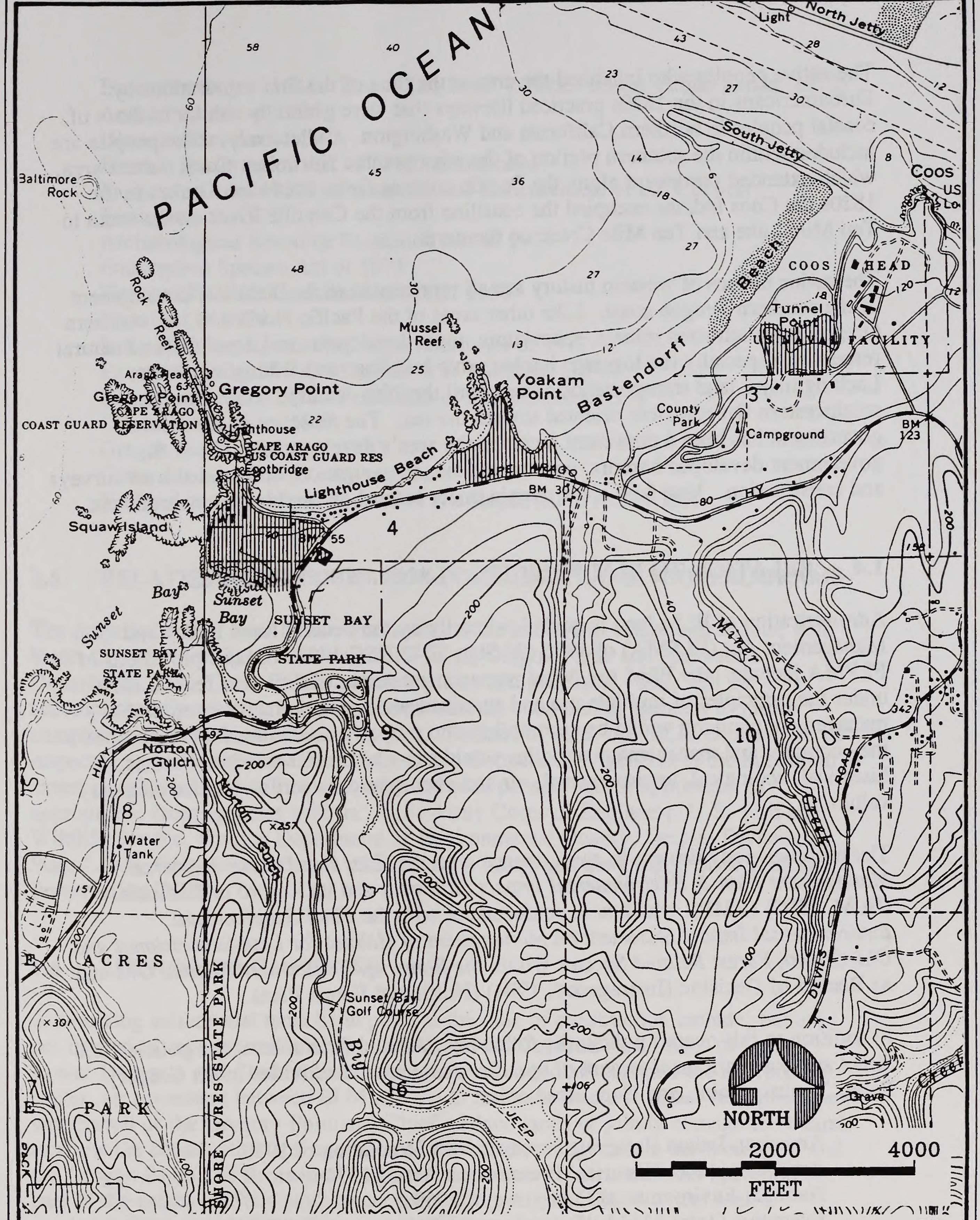
1.2 PURPOSE AND NEED

The purpose of the proposed action is to construct and operate an interpretive center that presents (1) the natural history of Oregon's southern coast; (2) the cultural heritage of the Coos, Lower Umpqua, and Siuslaw Indians; and (3) local U.S. Coast Guard history. The need for the proposed action is to provide historic accuracy and authenticity, preserve and restore tribal culture, satisfy the demands for heritage tourism and eco-tourism, deliver a high quality education and recreation experience, and develop economic opportunities for the community.

1.3 GENERAL LOCATION

The Preferred Alternative and the other build alternatives considered in detail are located on the south coast of Oregon, near Coos Bay (Figure 1). The project area is within the Sitka spruce zone. The area is characterized by mild winters and summers. The vegetation communities have been repeatedly altered by human activity, including timber harvest, land clearing, fire, and development. The geological composition and orientation, combined with tidal erosion, have resulted in rocky headlands; cliffs; and platform, submerged, and exposed rocks, with interspersed sandy beaches. The resulting mix of substrates, vegetation communities, and weather conditions (including effects of the ocean) have resulted in diverse intertidal communities, marine bird and mammal populations, and upland wildlife communities.

Land use in the project area is characteristic of the Oregon coastal shoreland environment. Primarily undeveloped or used for recreation, land uses in the project area also include federal government facilities, privately-owned residences, and a small agricultural area.



7941202 October 1995

Alternative site locations at Gregory Point, Yoakam Point, and Coos Head for the Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon (U.S.G.S. Charleston and Cape Arago 7.5-minute quadrangles, 1:24000, 1972, photorevised 1973).

FIGURE 1

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The native peoples who inhabited the area at the time of the first explorations by Euroamericans in the 1820s practiced lifeways that were generally similar to those of coastal peoples in northern California and Washington. Collectively, these peoples are included within the southern portion of the ethnographic Northwest Coast culture area, which extended northward along the Pacific coast as far as southeast Alaska. In the 1820s the Coos Indians occupied the coastline from the Coquille River on the south to Ten Mile Lake and Ten Mile Creek on the north.

The major themes of western history are all represented in the historical development of the southern Oregon coast. Like other areas of the Pacific Northwest, the southern Oregon coast attracted miners, speculators, town developers, and developers of natural resources, especially the logging, lumber, ship building, and fishing industries. Lacking major land transportation routes until the 20th century, settlements in southwestern Oregon were oriented toward the sea. The presence of the federal government has been a consistent factor in the area's development. The U.S. government developed harbors, constructed aids to navigation, and funded road surveys and construction. Vast land areas remain under federal ownership and management.

1.4 RELATION TO BLM POLICIES, PLANS AND PROGRAMS

Administration of BLM land is guided primarily by the Federal Land Policy and Management Act (FLPMA) of 1976 (90 Stat. 2742 USC 1701). Major provisions of FLPMA include: the BLM has broad management responsibility over federal lands under the principles of multiple use and sustained yield; comprehensive resource management planning would be accomplished to properly use the land and resources they contain; and management activities would strive to protect scientific, scenic, historical, ecological, environmental, air and atmosphere, water, and archaeological values.

The proposed activities are in conformance with the *Coos Bay District Resource Management Plan & Environmental Impact Statement* and its Record of Decision (BLM, 1995) (RMP); which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* and its Record of Decision (Interagency, 1994) (Northwest Forest Plan).

In addition to this overall policy, the following state and federal laws and policies also direct and constrain management of specific resources and activities in the Gregory Point, Yoakam Point, and Coos Head areas:

American Indian Religious Freedom Joint Resolution of 1978
Archeological & Historical Preservation Act of 1974
National Environmental Policy Act of 1969
Executive Order 11514 - Protection and Enhancement of Environmental Quality (1970)
Land and Water Conservation Fund Act of 1974

Executive Order 11644 - Use of Off-Road Vehicles on the Public Lands (1972)
Antiquities Act of 1906
Historic Sites Act of 1935
Historic Preservation Act of 1966, as amended
Executive Order 11593 - Protection and Enhancement of the Cultural Environment (1971)
Archaeological Resource Protection Act of 1973
Endangered Species Act of 1973
Fish and Wildlife Coordination Act of 1958
Sikes Act of 1974
Soil and Water Resources Conservation Act of 1977
Executive Order 11990 - Protection of Wetlands (1977)
Executive Order 11988 - Protection of Floodplains (1977)
Clean Water Act of 1977
Oregon Land Use Act of 1973
Clean Air Act of 1963, as amended
Native American Grave Protection and Repatriation Act of 1992

1.5 RELATIONSHIP TO NON-BLM POLICIES, PLANS, AND PROGRAMS

The proposed action must be in compliance, to the maximum extent practicable, with State, County, Tribal, and other agencies (e.g., Oregon Parks and Recreation Department, U.S. Coast Guard) policies, plans, and programs. This will be accomplished by entering into agreements with the cooperating agencies to insure compliance with their plans and programs. Policies of other non-BLM entities will be respected and adhered to by the EIS Lead and Cooperating Agencies to the maximum extent possible. BLM will consult with and seek permits and/or approvals, as appropriate, from agencies such as: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Oregon Department of Environmental Quality, Oregon Division of State Lands, Oregon Department of Fish and Wildlife and the Oregon State Historic Preservation Office.

1.6 AUTHORIZING ACTIONS

Authorizing actions that must be in place at the time of construction include, but are not limited to, an agreement between BLM and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians to construct and jointly operate the interpretive center; an agreement between BLM and the U.S. Coast Guard to either relinquish their withdrawal of the Gregory Point and Chief's Island lands or jointly manage these lands to allow the construction and operation of the center; an agreement between BLM and the Oregon Parks and Recreation Department to allow construction and operation of part of the center on State lands under their administration; BLM would seek a conditional use permit from Coos County to allow this facility on lands zoned as "Forestry;" and various permits from other licensing agencies for electric, sewer, water, and construction permits.

Section 2.0

Alternatives Considered

2.0 ALTERNATIVES CONSIDERED

2.1 PROPOSED ACTION (BLM PREFERRED ALTERNATIVE)

The Confederated Tribes and the BLM are proposing to construct and operate an interpretive center at Gregory Point, on the south coast of Oregon, near Coos Bay. This site is the Preferred Alternative due to its historical significance to the Confederated Tribes (it contains an ancient Coos Tribe village and an area reserved as a tribal cemetery) and its location in relation to the existing Cape Arago Lighthouse and former U.S. Life-Saving Service Station. The proposed Bal'diyaka Interpretive Center would be located on the approximately 30-acre headland area north of Sunset Bay, west of Cape Arago Highway, and south of Lighthouse Way (Figure 1). The proposed interpretive center would provide a multi-faceted heritage tourism facility. The center would interpret the natural history of the south Oregon coast, the cultural heritage of the Coos, Lower Umpqua, and Siuslaw Indians, and the local U.S. Coast Guard.

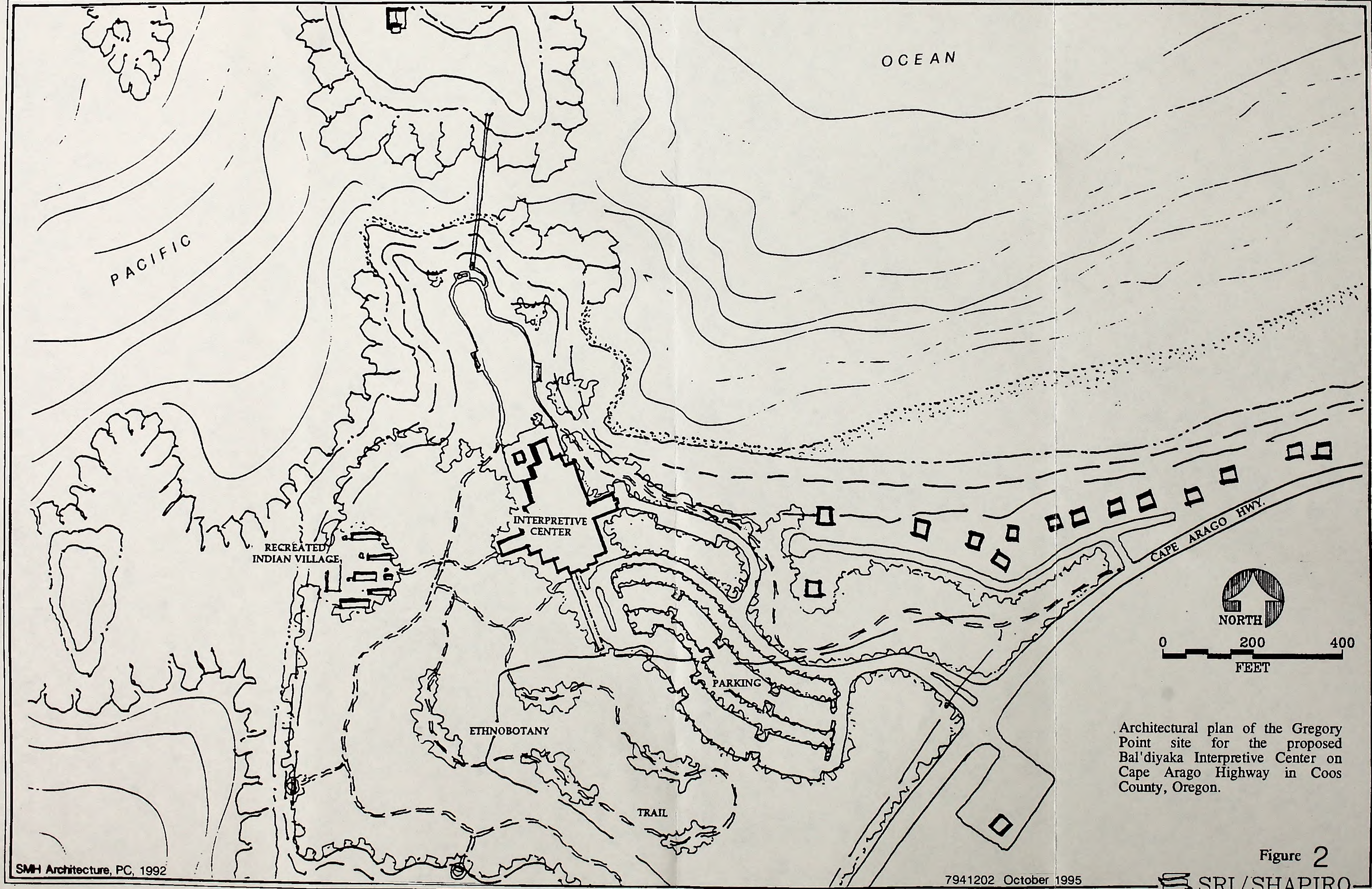
The interpretive center would contain the following elements:

- A 51,000-square-foot interpretive center building;
- A recreated coastal Indian village;
- An ethnobotanical interpretive trail;
- Vehicular circulation and parking; and
- Utilities and infrastructure.

The interpretive center building would be partially located on the site of the existing U.S. Coast Guard housing unit, which would be demolished prior to construction. The interpretive center building would be oriented on the property to allow views of the lighthouse, as well as the coast (Figure 2). The building, while not yet designed, is envisioned as a low-profile structure (a maximum of two stories) constructed of indigenous materials (native wood and stone). The building would integrate the environment into the structure and is envisioned to have an asymmetrical floor plan; a broad, overhanging, low-pitched roof; and large windows (Figure 3). The interpretive center building would contain the functions and areas listed in Table 1:

Table 1. Summary of Building Functions and Areas

Building Functions	**Net Square Footage**
Orientation, Lobby, and Restrooms	2,600
Gift Shop	1,000
Permanent Exhibit Galleries	14,000
Temporary Exhibit Gallery	2,500
Multi-Use Auditorium	5,000
Administration	2,125
Curation and Collections	4,250
Ancillary Services Areas	4,450
Lighthouse/Observation Tower (New)	1,200
Total Net Area	**37,125**
Total Gross Area	**50,912**



Architectural plan of the Gregory Point site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

Figure 2

7941202 October 1995

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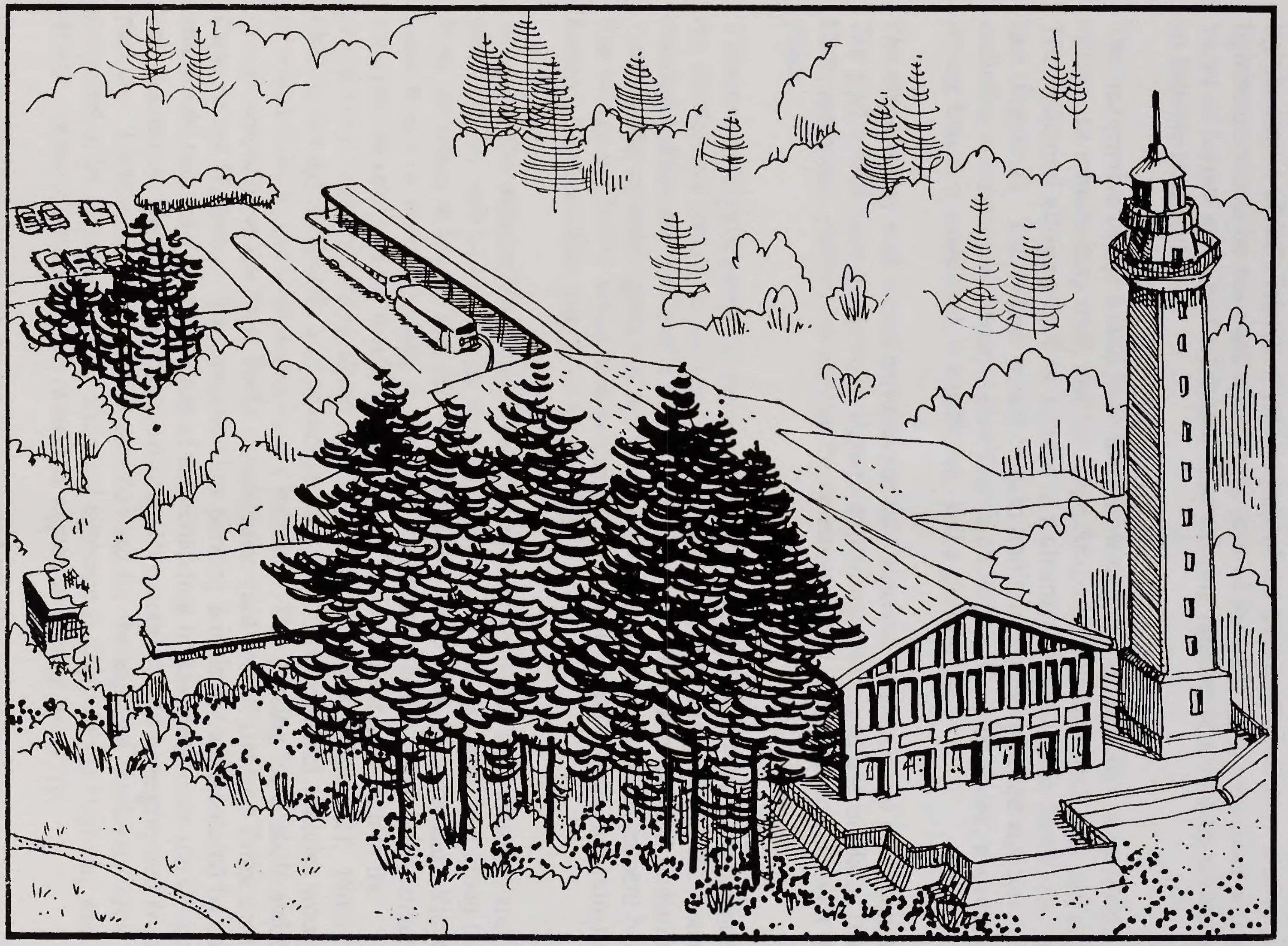

Drawn from SMH Architecture, PC, 1992

7941202 October 1995

Conceptual design for the proposed Bal'diyaka Interpretive Center building at Gregory Point on Cape Arago Highway in Coos County, Oregon.

FIGURE
3

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A new Cape Arago lighthouse and observation tower, in addition to the existing lighthouse on Chief's Island, would be part of the interpretive center. The new lighthouse would be designed to clear the tops of the existing spruce trees and allow views of Squaw and Chief's Islands. The existing lighthouse would be maintained as an historic landmark.

The interpretive center would have the following outdoor exhibits: a recreated Indian village; an ethnobotany trail; and the Cape Arago lighthouses, both new and existing. The replicated village would be located in a clearing of the conifer forest near the bluff line (Figure 2). The village would contain traditional cedar-planked structures, including a ceremonial house, a dwelling, a children's sleeping house, a sweathouse, a drying house, a woodshed, a windbreak, and a gravehouse.

The ethnobotany trail would traverse the site, adjacent to the natural plant communities. The trail would have interpretive signage explaining traditional use of plants (food, fiber, medicine, shelter), as well as the ceremonies and rituals associated with the plants.

Visitors would have access to the new Cape Arago lighthouse from both the interior of the interpretive center, as well as from outside, along the interpretive trail system. The existing lighthouse, on Chief's Island, would be restricted from general visitation. Tours of the existing lighthouse would be provided on a special-arrangement basis. The bridge to Chief's Island is structurally sound, but would require additional safety features (such as child guards or hand rails).

Access to the interpretive center is envisioned to be provided by pedestrian and bicycle pathways, as well as a vehicular approach. Pedestrian access would be along trails from the beach at Sunset Bay and the Sunset Bay State Park campground. Bicycle lanes would be provided along the internal road system at the interpretive center, and adequate bicycle parking would be provided. The vehicular approach to the interpretive center would be along the Cape Arago Highway (Figure 2). Public parking for approximately 130 passenger cars and 50 recreational vehicles would be provided close to the interpretive center building. Bus parking for schools and tour groups would be at the State Parks maintenance yard east of Gregory Point across the Cape Arago Highway. The proposed bus parking area is not administered by the BLM and would require a memorandum of understanding or easement from the Oregon Parks and Recreation Department. Staff parking (15 spaces) would be segregated from public parking. Lighthouse Way, a local service road for the adjacent residential area, is proposed to be improved with a relocated entrance at Cape Arago Highway and a cul-de-sac. Also, Lighthouse Way would be signed as private property.

Interpretive center lighting would be provided by 10-12-foot high lamps along the roadway and in the parking areas, and 1-2-foot high lamps along footpaths. Light poles and lamp enclosures would be wood or other appropriate materials. Light sources would be shielded to provide the appropriate illumination cut-off angle. This would prevent glare from the lamps.

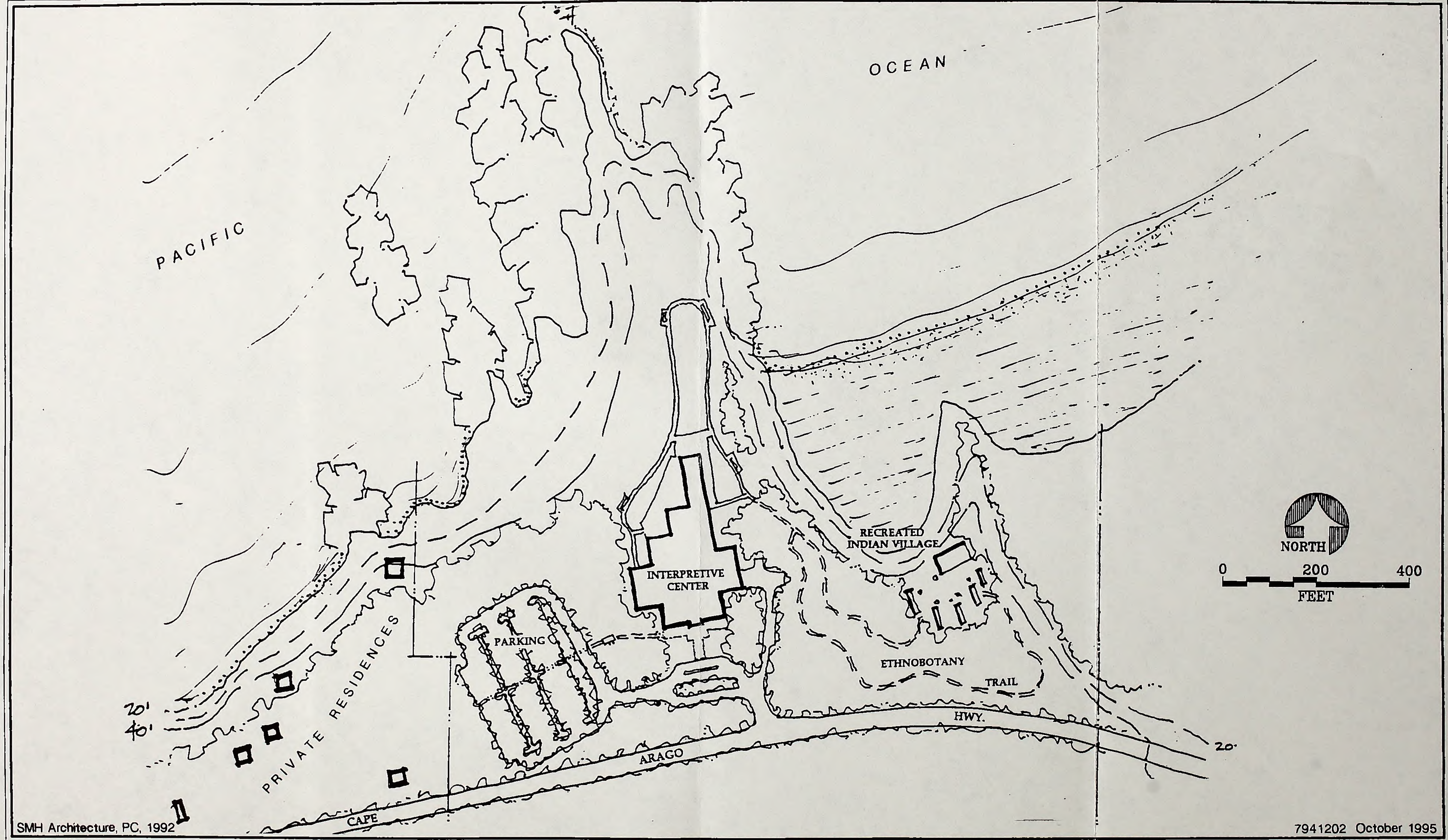
Fencing would be installed around the perimeter of the site to provide safety for visitors along the bluff line and after-hours security. This would also prevent trespassing onto adjacent private property. Security fencing, such as galvanized chainlink, would be 5-6-feet high and obscured by densely planted broadleaf shrubs. To preclude theft or vandalism, the site would be secured after-hours by gates at the entry drive and at all footpath entries.

Construction of the interpretive center, trails, recreated Indian village, and vehicular access would be designed to minimize disruption to existing vegetation. Construction would employ best management practices to control water drainage and prevent erosion. In areas to be landscaped, planting indigenous species would control soil erosion, as well as harmonize with the natural landscape character. Site-improvement design would include use of vegetative swales; detention areas; and infiltration facilities, such as infiltration trenches, porous pavement, and roof water drainage trenches.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

Two alternative sites, Yoakam Point and Coos Head, are considered in detail in this EIS. Alternative #1, the Yoakam Point site, is approximately 25 acres and is located 0.5 mile north of the Gregory Point site, along the Cape Arago Highway (Figure 1). Yoakam Point is not administered by the BLM. Use of this site would require a memorandum of understanding or easement from the Oregon Parks and Recreation Department. The site is bounded by Cape Arago Highway to the south, the Pacific Ocean to the north, private residences to the west and Bastendorff Beach to the east. All of the interpretive center elements described in Section 2.1, except for use of the existing lighthouse, pedestrian access from Sunset Bay, and improvements to Lighthouse Way, would be incorporated at Yoakam Point (Figure 4). Bus parking for schools and tour groups would be off-site at an existing parking lot in Charleston.

Alternative #2, the Coos Head site, is located approximately 1.5 miles east of the Gregory Point site, off the Cape Arago Highway (Figure 1). The site is approximately 25 acres and is bounded by Bastendorff Beach to the north and west, the U.S. Air Force facility at Coos Head to the east, and private residences to the south. As with the Yoakam Point site, the Coos Head site (Figure 5) would incorporate all of the interpretive center elements described in Section 2.1, except for the existing lighthouse, pedestrian access from Sunset Bay, and improvements to Lighthouse Way; bus parking would be off-site at an existing parking lot in Charleston. In addition, pedestrian access would be provided from Bastendorff Beach Park.



SMH Architecture, PC, 1992

7941202 October 1995

Architectural plan of the Yoakam Point site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE
4

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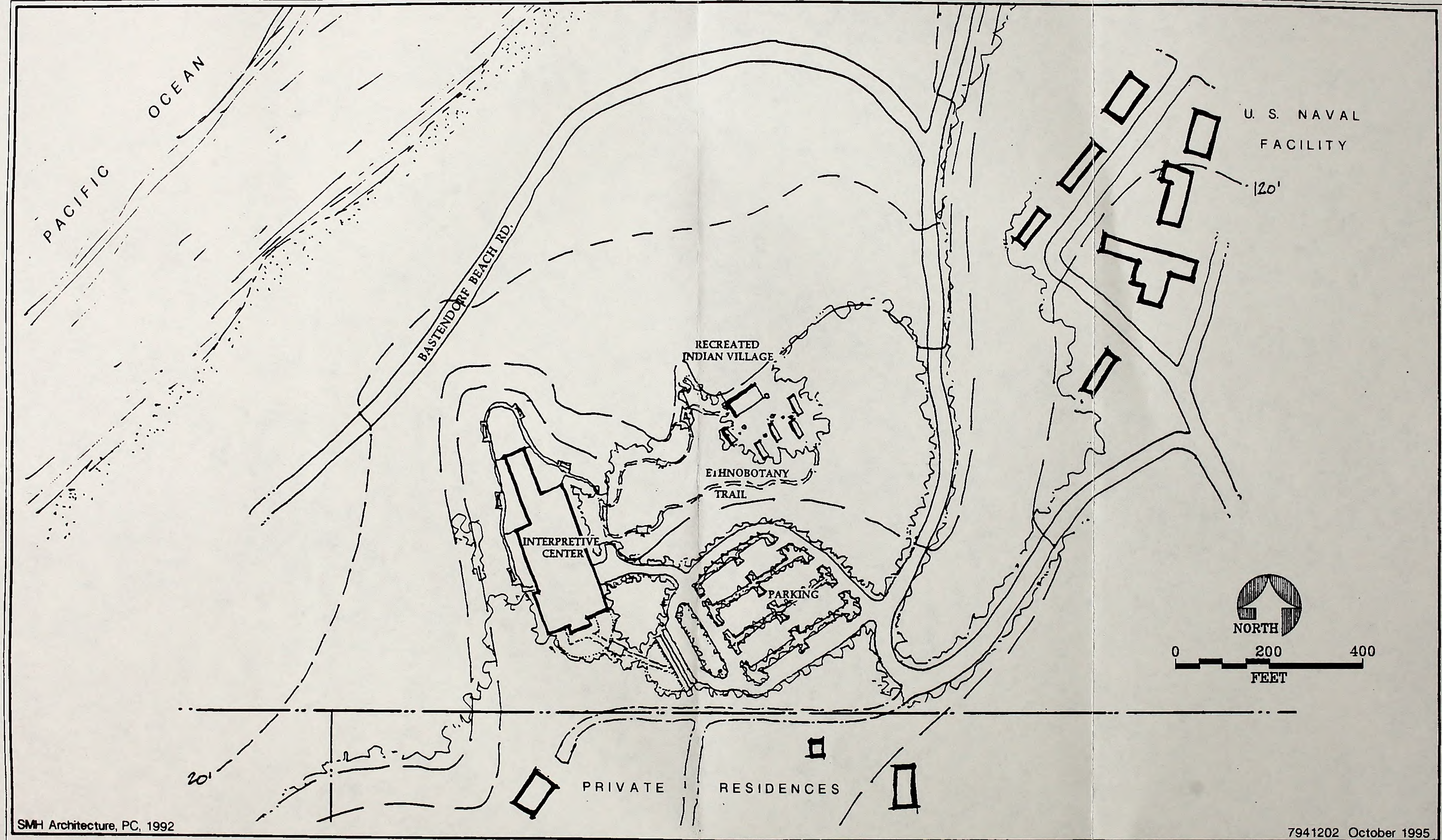


Architectural plan of the Coos Head site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE
5

SRI/SHAPIRO INCORPORATED

In addition to the proposed action and two alternatives described above, a No Action Alternative was considered. In this alternative, none of the elements discussed in Section 2.1 would be implemented and the three sites would remain in their existing conditions.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Through the scoping process and consultation with state and federal resource agencies, the following 21 alternative sites were suggested as potential locations for the Bal'diyaka Interpretive Center:

- Gregory Point
- Indian Point
- Sitka Dock
- Coos Bay Waterfront
- North Bend Waterfront
- Dean Creek
- Mouth of Joe Ney Slough
- Pony Slough area
- Empire
- Winchester Bay/Reedsport
- Yoakam Point
- Coos Head
- Area between Shore Acres and Cape Arago
- South end of Roosevelt Boulevard in Charleston
- Old Life Boat Station on North Spit
- A satellite site at Gregory Point with a main center at either:
  - Route 101
  - Pony Slough area
  - Winchester Bay
  - Dean Creek
  - Coos Bay Waterfront
  - North Bend Waterfront

Representatives of the BLM, U.S. Coast Guard, Oregon Parks and Recreation Department, Oregon Department of Fish and Wildlife, and Confederated Tribes met to discuss the alternatives and select those that would be studied in detail.

The suggested alternative sites were rated for the presence or absence of the following six criteria:

1. Significant historical association with Confederated Tribes;
2. Historical association with U.S. Coast Guard;
3. Sufficient usable size (at least 24 acres);

4. Sufficient existing road access and area for parking;
5. Proximity to source of tourists; and
6. Natural setting (mature forest vegetation).

The results of the ratings are presented in Table 2 and summarized in the following text.

Gregory Point, the subject of the initial proposal for an interpretive center, clearly met all six criteria, and was recommended for detailed environmental studies.

Indian Point, located on the west side of the South Slough, south of the City of Charleston, has three of the six criteria. The site lacks historical association with the U.S. Coast Guard, is not serviced by an improved road, has topographic features that would make providing sufficient parking problematical, has questionable proximity to a source of tourists, and was rated as not having a natural setting. The site was eliminated from further consideration.

Sitka Dock, located on Coos Bay and adjacent to Empire, has four of the six criteria. The site lacks historical association with the U.S. Coast Guard and a natural setting. The site also has questionable significant historical association with the Confederated Tribes. The site was not recommended for further environmental study.

The Coos Bay waterfront was rated as having three of the six criteria. The site lacks significant historical association with the Confederated Tribes, sufficient size, and a natural setting. The site was eliminated from further consideration.

The North Bend waterfront was rated as having two of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, sufficient size, and a natural setting. The site was eliminated from further consideration.

The Dean Creek area was rated as having two of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, sufficient size because of the presence of a large wetland system, and a natural setting. This site was also eliminated from further consideration.

The area at the mouth of Joe Ney Slough was rated as having four of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, and has a questionable natural setting. The site was not recommended for further environmental study.

The Pony Slough area was rated as having three of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, and lacks a natural setting; however, the site is recognized as having a U.S. Coast Guard affiliation nearby. The site was eliminated from further consideration.

Table 2. Decision Criteria Alternatives Analysis for Bal'diyaka Interpretive Center

Site	Significant Historical Association with Confederated Tribes	Historical Association U.S. Coast Guard	Sufficient Usable Size (24 acres)	Criteria Sufficient Road Access/ Parking	Proximity to Source of Tourists	Natural Setting	Total Number of Attributes
Gregory Point	+	+	+	+	+	+	6
Indian Point	+	−	+	−	+/−	−	3
Sitka Dock	+/−	−	+	+	+	−	4
Coos Bay Waterfront	−	+	−	+	+	−	3
North Bend Waterfront	−	−	−	+	+	−	2
Dean Creek	−	−	−	+	+	−	2
Mouth of Joe Ney Slough	−	−	+	+	+	+/−	3
Pony Slough area	−	−	+	+	+	−	3
Empire	+/−	−	+	−	+/−	−	3
Winchester Bay/Reedsport	−	+	−	+	+	+/−	4
Yoakam Point	+	−	+	+	+	+	5
Coos Head	+	+	+	+	+	+/−	5
Between Shore Acres & Cape Arago	−	−	+	+	+	−	3
Roosevelt Boulevard (south end)	−	−	−	+	+	−	2
Old Life Boat Station (North Spit)	+	+	+	−	−	+/−	4
Satellite Site at Gregory Point							
with Main Center at:							
Route 101	−	−	+	+	+	−	3
Pony Slough Mall	−	−	+	+	+	−	3
Winchester Bay	−	+	−	+	+	+/−	4
Dean Creek	−	−	−	+	+	−	2
Coos Bay Waterfront	−	+	−	+	+	−	3
North Bend Waterfront	−	−	−	+	+	−	2

An area southeast of Empire was suggested as a potential site. It was rated as having three of the six criteria, although two of the criteria are questionable. The site lacks historical association with the U.S. Coast Guard and has questionable significant historical association with the Confederated Tribes. The site lacks sufficient road service, was recently clearcut, and lacks a natural setting. The site also has questionable proximity of tourists. The site was not recommended for further environmental study.

The Winchester Bay/Reedsport area was rated as having four of the six criteria. The specific site lacks significant historical association with the Confederated Tribes, and lacks sufficient size. The site has a questionable natural setting and was eliminated from further consideration.

Yoakam Point was rated has having five of the six criteria. The site lacks historical association with the U.S. Coast Guard, although it has views of the Cape Arago Lighthouse. This site was recommended for detailed environmental studies.

Coos Head was rated as has having five of the six criteria; however, the site has a questionable natural setting. The site was recommended for detailed environmental studies.

The area between Shore Acres and Cape Arago was rated as having three of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, and lacks a natural setting. The site was eliminated from further consideration.

The area at the south end of Roosevelt Boulevard was rated as having two of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, sufficient size, and a natural setting. The site was eliminated from further consideration.

The site of the old Life Boat Station on North Spit was rated as having four of the six criteria. The site lacks sufficient existing road access, and proximity to a source of tourists. The site has a questionable natural setting and a heron rookery is present. The site was eliminated from further consideration.

It was suggested that as a potential alternative, the interpretive center be located on two sites: Gregory Point as a satellite site with the main interpretive center being at a distant site. The following locations for the main interpretive center were suggested: a site on Route 101, the Pony Slough area, Winchester Bay, Dean Creek, Coos Bay Waterfront, and North Bend Waterfront. A site on Route 101 was rated as having three of the six criteria. The site lacks significant historical association with the U.S. Coast Guard and the Confederated Tribes, and a natural setting. This suggested alternative was eliminated from further consideration. The other locations of the main interpretive center were eliminated from further consideration based on the reasons given in previous text.

The agencies present at the alternatives analysis meeting agreed that Gregory Point, Yoakam Point, and Coos Head should be studied in detail in this EIS.

2.4 SUMMARY AND COMPARISON OF POTENTIAL IMPACTS

A detailed discussion of existing conditions and potential effects is presented in Section 3. A comparison of potential impacts is included in Table 3. Impacts are relative to the No Action Alternative and are discussed below.

Geology

Potential impacts of the interpretive center on geology are minor to moderate at all of the alternative sites, with the potential being greater at Gregory Point and Yoakam Point. Because these two sites are subject to wave erosional forces, changes to vegetation near the bluff line (due to visitors going off the trails and near the edge of the headland) may lead to increased erosion and sloughing of the headland in comparison to the Coos Head and No Action alternatives.

Soils

Potential impacts due to soil erosion are minor to moderate at all the sites. However, because of the presence of several water features on the Coos Head site, construction of the interpretive center may lead to increased soil erosion in comparison to the Gregory Point, Yoakam Point and No Action alternatives. All sites have the potential of windthrows. The No Action Alternative would not result in any effect on soils.

Groundwater

Potential impacts on groundwater by construction or use of the interpretive center are minor at all the sites. The No Action Alternative would not result in any effect on groundwater.

Surface Water

Potential impacts due to soil erosion are minor at all the sites. However, because of the presence of several water features on the Coos Head site, construction of the interpretive center may lead to increased soil erosion and runoff of construction machinery pollutants in comparison to the Gregory Point, Yoakam Point, and No Action alternatives. The No Action Alternative would not result in any effect on surface water.

Table 3. Comparison of Impacts

Element	Proposed Action	Alternative		
		Yoakam Point	Coos Head	No Action
Geology	−3	−3	−2	0
Soils:				
Erosion Potential	−2	−2	−3	0
Windthrow	−2	−2	−2	0
Ground Water	−1	−1	−1	0
Surface Water	−1	−1	−2	0
Vegetation	−3	−2	−2	0
Wildlife:				
Habitat	−2	−2	−3	0
RTE Species	−2	−2	−1	0
Wetlands	−1	−1	−2	0
Aquatic Ecology	−2	−2	−1	0
Air Quality	−1	−1	−1	0
Cultural Resource	−3	−2	−1	0
Paleontological	−2	−2	−1	0
Social and Economic Values	+3	+3	+3	0
Land Use:				
Adjacent Land Use	−1	−1	−1	0
Change in Existing Land Use	−1	−2	−2	0
Recreation:				
Opportunity	+2	+2	+2	0
Use of Existing Facilities	−1	−1	−1	0
Visual	−1	−2	−3	0
Infrastructure	−2	−2	−1	0
Access	−1	−1	−2	0
Noise	−1	−1	−1	0
Hazardous Materials	−2	−1	−1	0

Level of Impact = 0−5
0 = No Impact
5 = Highest Impact
− = Adverse Impact
+ = Positive Impact

Vegetation

Potential impacts on vegetation are similar for all the alternatives. However, a greater proportion of forest exhibiting old growth characteristics would be affected on Gregory Point. Approximately five acres of forest would be cleared for construction of the interpretive center on any of the sites. The No Action Alternative would not result in any effect on vegetation.

Wildlife

While the area of vegetative disturbance is approximately the same at all the sites, the disturbance to habitat due to fragmentation varies. Because of the relative size and placement of the interpretive center on the sites, the potential impact on habitat is most severe at the Coos Head site and least severe at the Gregory Point site. Potential impacts on rare, threatened or endangered species known to use the sites are minimal to moderate at all the sites, depending on species, and are primarily related to direct and/or indirect disturbance. Potential impacts on rare, threatened or endangered species for which suitable habitat is present, but has not been observed on the sites, range from minimal to high, depending on the species. The probability of these species actually using the sites is unknown. The No Action Alternative would not result in any effect on wildlife.

Wetlands

Direct filling of wetlands would not occur on any of the sites, including the No Action Alternative. Potential for indirect impacts is higher at the Coos Head site, because it contains water features, which may receive sediments during construction. Indirect impacts on wetlands on Gregory Point are possible, although these would be minor due to the wetland's small size and the relatively level topography of the site.

Aquatic Ecology

Potential impacts on aquatic ecosystems in the vicinity of all the sites are minor, but may be greater at Gregory Point and Yoakam Point. The rocky intertidal shores of these two sites are more sensitive to trampling than the sandy shores near Coos Head. The No Action alternative would not result in any effect on aquatic ecosystems of the region.

Air Quality

Potential impacts due to air quality are minor at all the sites. The No Action Alternative would not result in any effect on air quality.

Cultural Resources

Potential impacts on archaeological and historical resources by vandalism or trampling are greatest at Gregory Point, because of the presence of resources at or near the site. Yoakam Point also has a cultural resources presence and the use of the interpretive center may affect those resources. Coos Head has no known cultural resources and use of the site would result in minor potential impact. The No Action Alternative would not result in any effect on cultural resources of the region.

Paleontological Resources

Potential impacts on paleontological resources by construction or use of the interpretive center are minor at all the sites, but may be greater at Gregory Point and Yoakam Point. These two sites are subject to more erosion, which may expose fossil resources to visitors. The No Action Alternative would not result in any effect on paleontological resources.

Social and Economic Values

Construction and use of the interpretive center would have the same positive economic effect, regardless of the site selected. The interpretive center would increase tourism in the region and provide long-term, on-site employment opportunities compared to the No Action Alternative.

Land Use

Potential impacts on land use are minor at all the sites. Adjacent recreational and residential land uses would be affected at all the sites to the extent that the proposed use represents an increase in intensity from the existing use. However, the facilities would not be visible from adjacent areas because of buffering provided by heavy forest cover. Change in existing use would be less at the Gregory Point site than at either Yoakam Point or Coos Head, because the site already is partially developed with U.S. Coast Guard facilities. The No Action Alternative would not result in any effect on land use.

Recreation

Potential impact on recreational opportunity is expected to be positive at all the sites, because a new facility would be available as a tourist attraction. However, increased tourism resulting from the interpretive center likely would result in increased use of surrounding facilities, some of which are at or near capacity. This impact on nearby facilities is considered negative, because increased use potentially would not be accommodated at certain times of the year. The No Action Alternative would not result in any effect on recreation.

Visual Resources

Potential impacts on visual resources are minor for all the sites; however, because the project would be most visible at the Coos Head site, it would be most affected. At all the sites, the most prominent visual feature would be the proposed observation tower, which would be visible above the tree line. At both the Yoakam Point and Coos Head sites, the interpretive center also would be visible from certain locations. The project would not be visible from Cape Arago Highway at any of the sites. The visual contrast rating for vegetative and structural changes at all three sites is considered either weak, weak to moderate, or moderate. The No Action Alternative would not result in any effect on visual resources.

Infrastructure

Impacts on infrastructure are minor for all sites. In general, water, telephone, electric and sewer service would need to be extended to all the sites, or existing lines would need to be upgraded. Gregory Point and Yoakam Point currently have more limited access to utilities than the Coos Head site, because the area surrounding it is more developed. The No Action Alternative would not result in any effect on infrastructure.

Access

Both the Gregory Point and Yoakam Point sites have direct access from Cape Arago Highway; access to the Coos Head site is via Coos Head Road. The primary difference in impact between the alternatives is due to existing background traffic volumes. At the Gregory Point and Yoakam Point sites, the increase in daily traffic is expected to be between 75 and 140%, and the level of service would remain the same. Whereas, the increase in daily traffic at the Coos Head site would be between 40 and 75%, but the level of service would decrease from A to B. No traffic operations impacts requiring intersection or highway mitigation are expected at any of the sites. The No Action Alternative would not result in any effect on access.

Noise

Construction noise would occur at all the sites; however, this impact would be minor and of limited duration. General background noise associated with the new interpretive center also would increase once it is completed. The largest noise level increase at all the sites would likely be related to increased vehicle trips and parking lot activity. The No Action Alternative would not result in any effect on noise.

Hazardous Materials

Potential impacts from hazardous materials are minor at all the sites. Impacts would be slightly higher at the Gregory Point site because removal of an underground storage tank, demolition of housing units, and potential removal of a water line would be necessary. The No Action Alternative would not result in any effect on hazardous materials.

Section 3.0

Affected Environment, Environmental Consequences, and Mitigation Measures

3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.1 NATURAL ENVIRONMENT

3.1.1 GEOLOGY

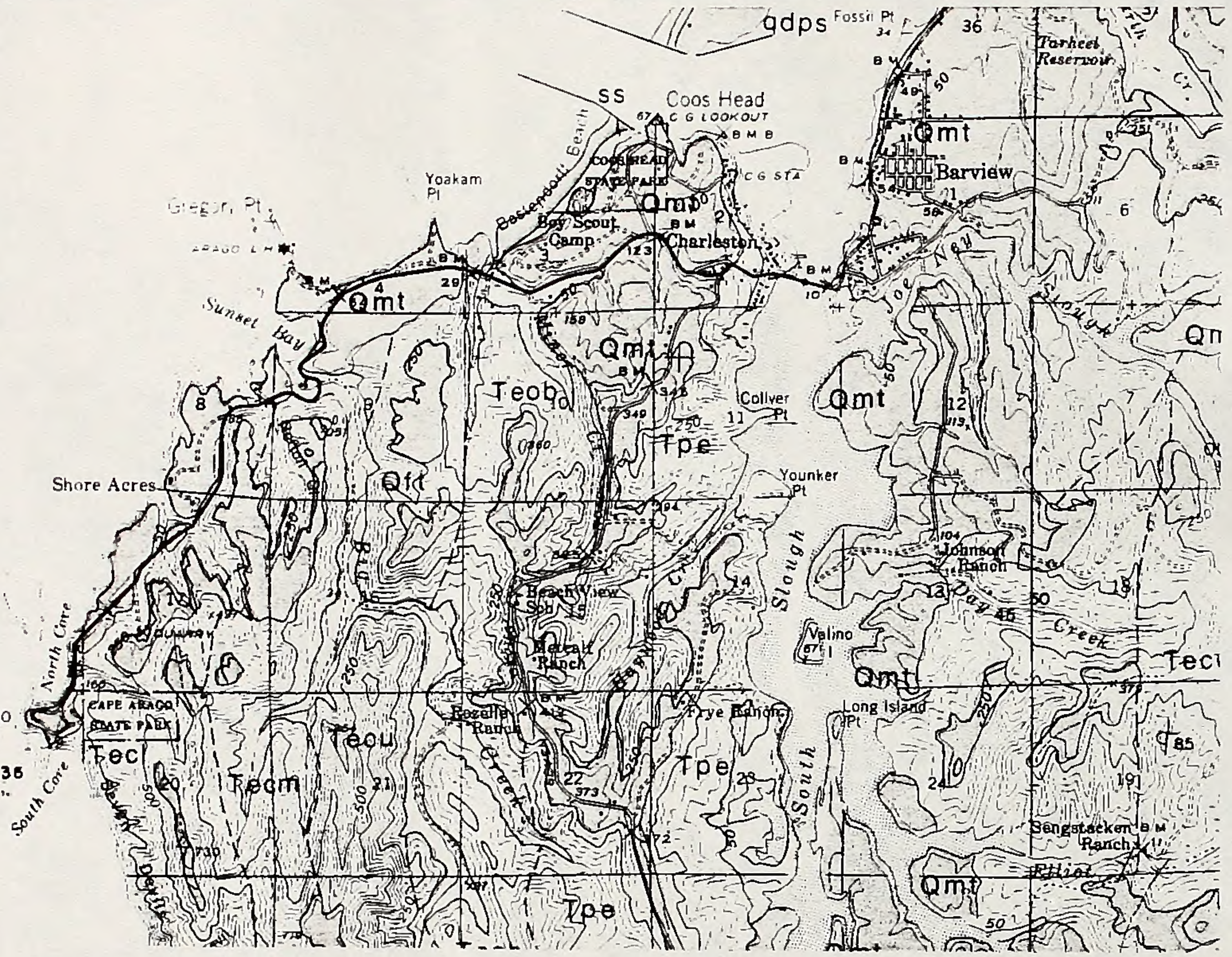
3.1.1.1 Affected Environment

Regional

The three sites being considered for the Bal'diyaka Interpretive Center are located in similar geologic settings. Two of the sites (Gregory Point and Yoakam Point) have direct ocean exposure, the third is separated from the ocean by a beach that periodically is inundated during high tides and storm events. A map showing the regional geology for each potential site is presented as Figure 6. Each site is situated on a relatively level marine terrace at about elevation 40 feet above the Pacific Ocean. Steep bluffs that expose steeply tilted sedimentary bedrock surround each of the terraces. The upper surfaces of the marine terraces have developed soils by weathering processes, with a somewhat variable resulting soil depth.

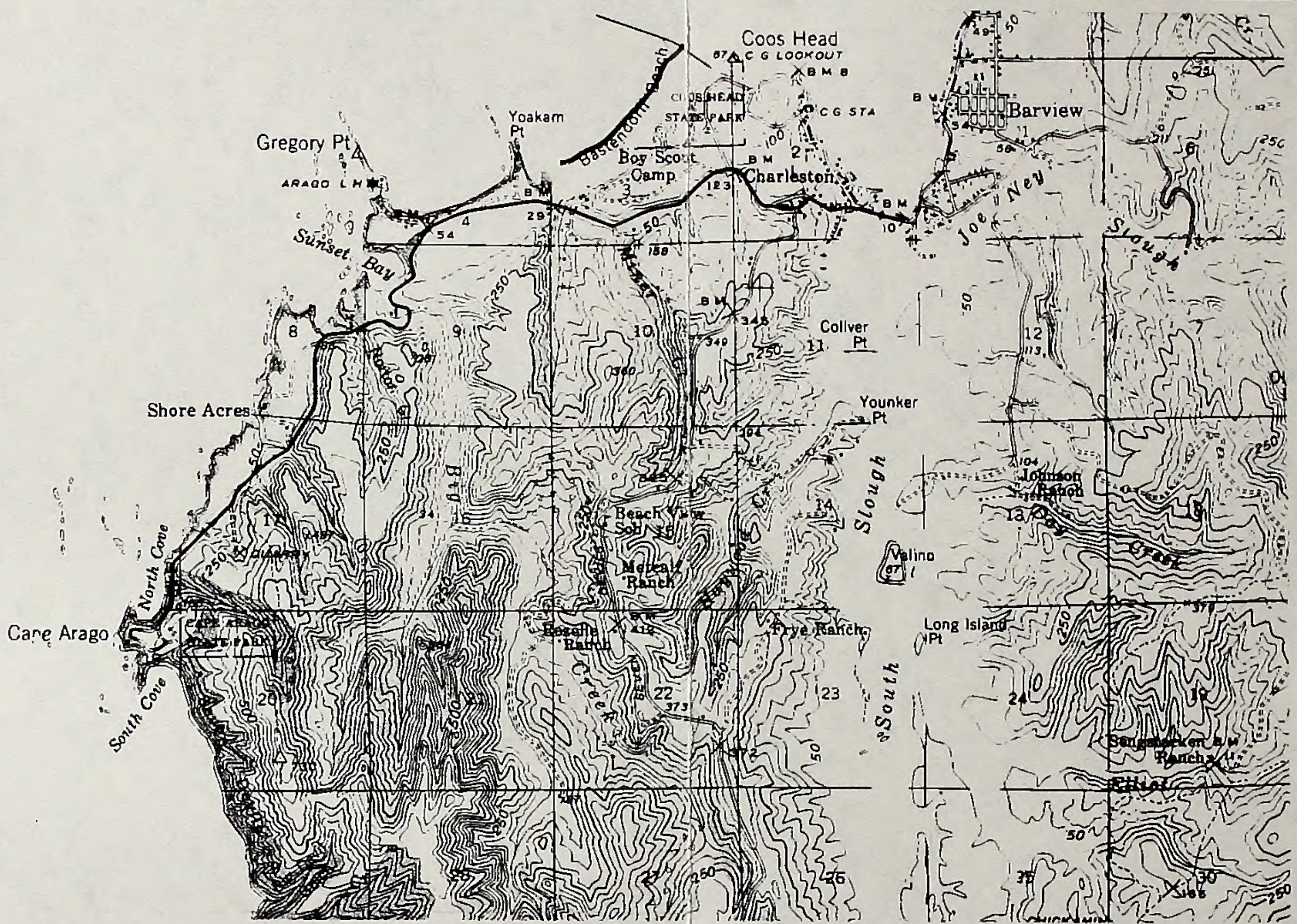
Geologic Setting. The marine terraces were formed during periods of higher relative sea levels at which time the wave actions beveled a relatively level surface in the tilted bedrock, called a wave-cut bench. After erosion of the bench, beach sand was deposited, providing a smooth surface mantle of sand. These level sand-mantled benches were later uplifted by tectonic deformation, forming the terraces. A photograph (Figure 7) represents a typical geologic profile of the sites. Variations occur from site to site, as discussed below. At least two different ages of terraces are found on the subject sites, based on the degree of weathering and cementation of the sand terrace deposits.

Bedrock at the sites is exposed in perimeter bluffs, and consists of steeply tilted sedimentary rocks of the Coaledo Formation, Bastendorff Shale, and Tunnel Point Sandstone. These formations were deposited in a near-shore ocean environment during middle to upper Eocene time, about 38 to 45 million years ago. The sedimentary deposits originated in a near-shore delta during a cycle of ocean advance and retreat. The delta was supplied with fine sand, silt, and clay sediments from rivers originating in the ancestral Klamath Mountains, to the south. The extensive exposures of these units provide a display of a wide variety of sedimentation processes that occur in delta deposits, and have a high educational value as a result. Some of the particularly interesting features include cross-bedding in the sandstones, fossiliferous layers, and occasional coal beds derived from vegetative matter that existed along the paleoshoreline.



Qft	Quaternary fluvial terrace deposits: *Unconsolidated to semi-consolidated flat-lying and elevated deposits of river alluvium overlooking present stream valleys (Quaternary alluvium) and situated above the present levels of flooding; also includes fine-grained terrace deposits of estuarine origin; grain-size distributions similar to those of Quaternary alluvium and estuarine deposits; moderate ground-water production; hazards include ponding, local high ground water, and stream-bank erosion.*
Qmt	Quaternary marine terrace deposits: *Unconsolidated to semi-consolidated flat-lying and elevated marine deposits of sand, silt, clay and gravel locally; thicknesses vary from 10 to 50 feet, but locally are as little as 2 to 3 feet; elevations range from a few feet to several hundred feet near Coos Bay to almost 2,000 feet farther inland; ground-water production low to moderate; hazards may include headland erosion, stream-bank erosion, poor drainage, failure in deep cuts, and others, but generally are negligible; coastal Qmt mantled by stable dune sand.*
Totp	Tunnel Point Formation (Oligocene): *Coarse- to fine-grained tuffaceous sandstone and minor siltstone exposed only at Tunnel Point near the entrance to Coos Bay; subject to slow headland erosion prior to the development of Bastendorff Beach.*
Tecu Tecl	Coaledo Formation, upper and lower members (late Eocene): *Coarse- to fine-grained, hard, deltaic sandstone with interbeds of softer siltstone; well-developed bedding; conglomerate and coal beds present locally with more extensive coal deposits at depth; overlain by loamy sand, sandy loam and silty loam; low permeability and ground water potential; hazards may include slow to sporadic headland erosion locally and earthflow in deep cuts; flooding in coal mines minimal.*
Teob	Bastendorff Formation (late Eocene and early Oligocene): *Thinly bedded shale and siltstone confined to the South Slough, Isthmus Slough and Catching Creek areas; mantled by silty loam and silty clay loam; very low permeability and ground-water potential; hazards include erosion, slow mass movement, and failures in deep cuts.*
Tecm	Coaledo Formation – middle member (late Eocene): *Thinly bedded siltstone with minor sandstone interbeds; mantled by silty loam and silty clay loam; very low permeability and ground water potential; hazards include erosion, slow headland erosion, and local mass movement.*

from Squier Associates, 1995



Regional Slope

0 - 5%	*0-15% slopes locally; landforms include beaches, flood plains and other wetlands, fluvial and marine terraces; hazards include flooding, erosion, deposition, ponding, high ground water, compressible soils, and possible amplification of earthquake vibrations; land use potential excellent to good in areas of minimal hazards.*
>50%	*50% to vertical locally; landforms include uplands of the interior and sea cliffs; hazards include extreme erosion, rapid earthflow, debris flow, rockslide, and rockfall; land use potential restricted to well-managed logging and open space.*
▬	Potential Beach Erosion and Deposition: *Areas for which jetty construction, beach excavations, channel dredging, spoil disposal, and other artificial changes will initiate future beach erosion and/or deposition; extent of impact varies with size of project; beach areas presently stabilized with exception of seasonal variations.*
─	Headland Erosion: *Removal of headlands by waves; extremely slow in Pre-Tertiary terrain, sporadic to slow in Sandstone of Tertiary Age, and uniform and slow (several inches per year maximum) in Siltstone of Tertiary Age; no viable means of prevention; impact minimized by proper setback of structures.*

DOGAMI, Bulletin 87, Environmental Geology of Western Coos and Douglas Counties, Oregon.

Geology map of the Cape Arago-Coos Head area of the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

7941202 October 1995

Figure 6

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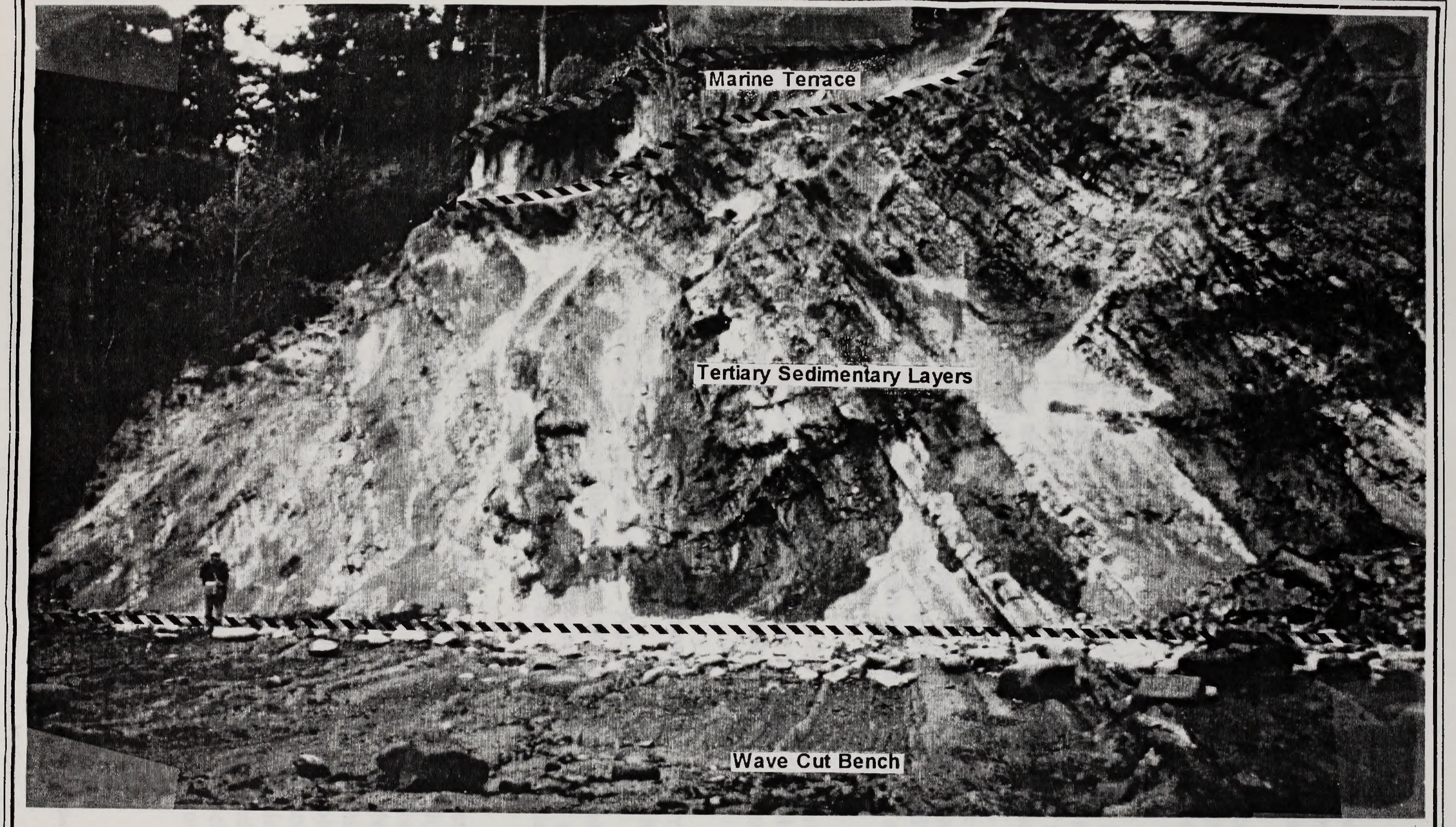

Squier Associates, 1995

7941202 October 1995

FIGURE
7

Example of tertiary sedimentary rock and landforms in the area of the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

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To produce the severely tilted condition of the original horizontal beds, extensive folding and faulting has occurred. Bedrock at all three sites have the same general structural trends, and are all located on the western flank of a north/south trending syncline, or trough, formed as a result of compressional tectonic stresses. The youngest rocks in a syncline are found in the center of the syncline. This particular syncline, centered in the South Slough of Coos Bay, has been the dominant feature controlling the deformation of the sedimentary rocks underlying the sites. The syncline is considered to be still actively subsiding.

Mineral Resources. Mineral resources in the region include the historic mining of "black sands," which were named for their dark color that resulted from heavy mineral concentrations. The black sand deposits are present in current beaches south of the site, and on marine terraces, generally near river mouths. Several valuable minerals including gold, platinum, chromite, with minor amounts of magnetite, feldspar, zircon, garnet, and other heavy minerals have been recovered from these deposits. The nearest recognized black sand deposits that have been mined begin at Seven Devils, located about two miles south of Gregory Point, and extend south to Port Orford. Small amounts of black sands have also been mined in the South Slough area, located about two miles southeast of the subject sites.

The Coaledo Formation was originally named after the discovery of coal beds within the sandstone and siltstone sequence that are present mostly in the Upper Coaledo Formation. The Coaledo Formation has historically been mined for coal in areas east and north of the subject sites.

The mining of construction aggregate (including sand and gravel) and rock quarries also is present in the region in a variety of geologic settings. Near the subject sites no identified historic or active quarries have been identified. Additional possible economic minerals include agates and jaspers derived from the Tertiary sandstones, but no known economic sources have been identified. Mineral fuel (oil and natural gas) exploration has occurred offshore from Coos County, but the major oil companies have shown little interest in the area's potential.

Geologic Hazards. Geologic hazards common to all sites primarily include coastal erosion along the oceanfront exposures and seismic hazards. Coastal bluff erosion rates are variable due in part to the variable resistance of the sedimentary bedrock layers, and in part due to the protection against direct erosion due to orientation of the bluff to waves and the presence of protective islands, reefs, beaches, or seastacks. In this regard, ongoing erosion of the headlands, and resulting slope instability in the bluffs and overlying marine terrace deposits, is a geologic hazard that is particularly acute at the Gregory Point and Yoakam Point sites. Bastendorff Beach provides protection against ocean erosion for the Coos Head site. A design concern for the proposed facilities would be to evaluate historic rates of erosion for the various sites, which, coupled with geologic interpretation of the erosion-susceptible units, should be utilized to determine appropriate set-backs for the various project features.

Seismic hazards are universal to the vicinity of all three sites. The understanding of the seismic risk in Western Oregon, particularly along the Cascadia Subduction Zone located near the Oregon Coast, is rapidly evolving. The potential for large earthquakes on the Oregon Coast is now widely recognized, with its source due to the ongoing subduction of the Juan de Fuca Plate beneath the North American Plate. The boundary between these tectonic plates is located some 50 miles offshore, with the potential maximum earthquake magnitude estimated at 8.0 to 8.5. A full discussion of this risk is beyond the scope of this document. Considering the proposed development, the primary seismic hazards that should be evaluated include ground shaking and ground rupture, the potential for subsidence or uplift, and the risk of earthquake-generated tsunami inundation.

Gregory Point

Gregory Point is the southernmost and westernmost of the three sites. This location places it furthest from the synclinal axis and accordingly the site is underlain by the oldest of the rocks considered in this study, the Lower Coaledo Formation. The Lower Coaledo Formation consists of cross-bedded sandstones; siltstones; and occasional conglomerates, predominantly pebble conglomerates. Variable hardness of the sedimentary beds respond differentially to wave erosion and have resulted in the exposures of more resistant sandstone beds that project into the surf or become isolated as sea stacks. This differential wave erosion formed Chief's Island. Erosion of the weaker siltstones and shale beds results in depressions in the coastal bluffs, which if large enough, may contain beach sand deposits.

The northeastern portion of the Gregory Point site is underlain by the Middle Coaledo Formation. The Middle Coaledo Formation was deposited during a period of maximum advance of sea level, and consequently is composed of finer grained sediments. In the Middle Coaledo Formation, sandstone beds are minor thin beds within the more extensive thin-bedded siltstone layers. The siltstone beds are easily eroded and the Middle Coaledo Formation is characterized by coastal beaches and indentations. This is controlling factor for the geologic evolution of Lighthouse Beach, adjoining Gregory Point to the east.

Erosion potential for the Gregory Point site is somewhat reduced due to the presence of protective natural features that provide limited protection for the headlands from ocean front erosion. In this regard, various seastacks and reefs, including the island where the lighthouse is located, limit the exposure of the proposed development site to aggressive ocean waves. Complete protection is not provided, however, and the perimeter bluffs display evidence of ongoing erosion and associated steep slope hazards including rockfall, landslides, and slumps. The extent of slope instability is generally restricted to the area near the bluffs, and extending 10 to 30 feet inward. Detailed evaluation of erosion hazard and related steep slope hazards would require an historical evaluation of erosion rates.

The surface of the marine terrace locally exhibits topographic relief. In this regard, a relatively small depression located in the southwest portion of the marine terrace surface was observed within the proposed development site. This basin was about 12 feet deep and the central portion contained a boggy area.

The Coos County Planning Department was contacted regarding any natural hazards that might limit development of the site. Coos County has identified the headland as a natural hazard for removal of headlands by ocean waves (Theda Kerns, pers. comm.). A county *Coastal Shorelands Inventory* map identifies the headland as having sporadic to slow erosion (Coos County, 1984).

Yoakam Point

Yoakam Point is located east of the Gregory Point site and Lighthouse Beach. The site consists of another set of headlands primarily composed of resistant sandstone beds that are part of the Upper Coaledo Formation. Prominent variations in the composition and erosion resistance of the beds have resulted in the spectacular erosion features of the site. A thin bed of coal was observed in bedrock exposures east of the major promontory for Yoakam Point. The presence of coal in the Upper Coaledo Formation represents an offlapping stage of sedimentation and a regression of the sea.

Nearly flat-lying Pleistocene age marine terrace sand deposits on the order of 3-10 feet in thickness overlie the near-vertical beds of the Upper Coaledo Formation. Cut slope exposures along the Cape Arago Highway reveal somewhat thicker marine terrace deposits of approximately 15 feet. Two distinct ages of marine terrace deposits are apparent in the cut slopes, based on weathering.

Geologic hazards related to ocean erosion for the Yoakam Point site are somewhat greater than for the other sites being considered. In this regard, the site has the most direct and unprotected exposure to aggressive wave attack. Reefs and protruding resistant sandstone beds provide very limited protection, and weaker beds between the resistant beds are actively being eroded. Slope hazards associated with ongoing erosion include rock fall hazards, slumps, and shallow landslides primarily within the relatively thin marine terrace deposits as support is removed below. The extent of slope instability and steep slope hazards is generally restricted to the area near the bluffs, and extending 10-30 feet inward. However, a detailed evaluation of erosion hazard and related steep slope hazards would require an historical evaluation of erosion rates.

The Coos County Planning Department was contacted regarding any natural hazards that might limit development of the site. Coos County has identified the headland as a natural hazard for removal of headlands by ocean waves (Theda Kerns, pers. comm.). A county *Coastal Shorelands Inventory* map identifies the west edge of the headland as having sporadic to slow erosion (Coos County, 1984).

Coos Head

The Coos Head site is located the furthest north and east of the three sites. The site is underlain by near-vertical beds of the Tunnel Point Formation of the upper Eocene age. Stratigraphically, the younger Tunnel Point formation conformably overlies fine-grained shales of the Bastendorff Formation (which was named for the exposures along Bastendorff Beach), which in turn conformably overlies the Upper Coaledo Formation exposed at the Yoakam Point site. The Tunnel Point promontory rises about 40 feet above the sandy beach that extends about 500 feet to the west at mean high tide. The Tunnel Point Formation is composed of a coarse to fine-grained sandstone.

Geologic hazards related to ocean erosion for the Coos Head site are somewhat less than for the other sites being considered. Bastendorff Beach provides complete protection against wave erosion through all but the most severe storm events. In this regard, youthful, but well-developed vegetation, coupled with accumulations of slope debris building up at the base of the steep bluffs as rockfall, indicate no significant wave erosion has occurred near the site for a significant number of years. Without the relentless wave erosion, substantially slower bluff erosion rates likely exist at this site. The stability of Bastendorff Beach is likely highly controlled by the presence of the South Jetty that bounds the entrance to Coos Bay. Any changes in the maintenance or presence of the South Jetty could have a pronounced effect on Bastendorff Beach, and ultimately on erosion rates at the bluff below the Coos Head site. Not considering wave erosion at the base of the bluffs surrounding the site, steep slope hazards still exist on the site. Rockfall, slumps, soil creep and minor landslides may occur due to slow weathering and erosion on the bluff faces.

The Coos County Planning Department was contacted regarding any natural hazards that might limit development. Coos County has identified an area that encompasses the entire site as being not suitable for residential, commercial, or industrial structures (Theda Kerns, pers. comm.). This designation is based on a Coos County Planning Department map titled *Development Potential within Ocean Shorelands and Dunes* (Coos County, 1984).

3.1.1.2 Environmental Consequences

Regional

Long term environmental consequences on geology and soils that result from operations of the Bal'diyaka Interpretive Center would most likely be the result of increased visitation to the sites. Because the sites are geologically interesting, an opportunity is presented to educate the public regarding geology and geologic hazards. However, increased visitation would increase public access to the sensitive bluff areas, with resulting pressures for rock and fossil collecting and uncontrolled travel down oversteepened beach fronts. If not restricted, increased pedestrian traffic on the steep slopes would result in increased erosion of the bluffs and reduce the visual quality of the existing geologic site features. Similarly, rock and fossil collecting, if uncontrolled, would have adverse consequences on the visual qualities of all sites.

As described above, all sites have exposure to variable degrees of ocean wave-driven erosion that, together with the proposed development could interact to have an environmental consequence. The following sections describe these consequences in more detail.

Gregory Point

Gregory Point is on a peninsula with a perimeter consisting of steep bluffs where the level marine terrace sands lie over tilted sedimentary bedrock. All three water fronting bluffs are steep and actively eroding. The strike of the resistant sandstone layers of Gregory Point slightly parallels the predominant direction of wave action. This orientation somewhat protects the headlands and minimizes the wave-cut erosion.

Access to the wave-cut bench areas at low tides would be desired by visitors due to the geologic features and ocean exposure. Increased foot travel on the relatively unstable and fragile bluff fronts would increase erosion rates. In addition, rock and fossil collecting would tend to decrease the visual appeal of the existing site geologic conditions.

Yoakam Point

Yoakam Point consists of a series of thin promontories that extend out into the Pacific Ocean; each promontory being composed of a resistant sandstone bed. The northern exposure of the Yoakam Point site faces the open ocean. The orientation of the steeply dipping sandstone layers at Yoakam Point provides only limited protection against ocean waves, and comparing the three sites, this site most likely is experiencing the highest ongoing erosion rate. Detailed study of historic aerial photographs is necessary to evaluate the current erosion rate at the site. Careful attention to erosion rates, with planned setbacks for site developments is particularly critical on the Yoakam Point site, where the smaller size also constrains the developable area.

Similar to the Gregory Point site, access to the wave-cut rock benches at low tides would be desired by visitors due to the geologic features and ocean exposure, however, much more limited areas for access exist. The primary area where foot access is possible also contains high-quality paleontologic and geologic bedrock exposures. Increased foot travel on the relatively unstable and fragile bluff fronts would increase erosion rates, particularly in the upper marine terrace sand. In addition, rock and fossil collecting would tend to decrease the visual appeal of the existing site geologic conditions. In this regard, fossil exposures at the Yoakam Point site may be more desirable than at the other sites, hence fossil collection pressures may be the greatest at this location.

Coos Head

The Tunnel Point promontory is situated above the sandy Bastendorff Beach and not directly accessible to wave erosion. The promontory does have nearly vertical perimeter bluffs on three sides and therefore is susceptible to steep slope hazards. However, because of the protection against ocean waves, and associated lower erosion rates, significant vegetation exists around and on the bluffs. The vegetation is a stabilizing factor, considering slope stability. In addition, the site does not have the spectacular wave cut bedrock benches that are attractive elements of the other potential sites. Hence, visitors would not be as inclined to traverse the steep bluffs.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.1.3 Mitigation Measures

Potential mitigation measures include the following:

- To prevent aggravation of existing slope instability, construction should be planned to avoid existing and future steep perimeter slopes using erosion rates determined by review of historic aerial photographs and other available data.

- During construction, erosion control measures should be implemented, including items such as silt fences, gravel surfacing of temporary construction roadways to control or prevent offsite transport of soils, and rapid reestablishment of vegetation. In addition, inspection and maintenance of erosion control mechanisms is necessary.

- Carefully planned and controlled public access to the wave-cut benches would reduce foot-travel induced erosion, as well as provide better visitor safety. However, considering the spectacular geologic and paleontologic resources of the sites, measures to increase the opportunities for public exposure is important. Preservation of the high scenic values would require that rock and fossil collection be strictly controlled.

- Considering the potential for large-magnitude earthquakes that may be generated on the Cascadia Subduction Zone, little can be done to mitigate potential seismic hazards. Important public safety measures include appropriate setbacks of major buildings from the potentially unstable bluff faces and earthquake-resistant design for major public buildings. Tsunami hazard at the site should be evaluated during final design, and considerations given to a tsunami warning system. The site elevations appear to be sufficient to offer protection against all but the largest tsunamis. Considering such an event, site evacuation plans offer the most practical mitigation.

3.1.2 SOILS

3.1.2.1 Affected Environment

Regional

The southern half of the Coos County coastline, which includes all three alternative sites, is composed of a series of marine terraces that stretch inland two to four miles. The terraces are composed of sandy sediment that was deposited during the early Pleistocene Age. Subsequent leveling by wave erosion and long-term regional uplift formed the gently sloping terraces that are visible today. The general soil map unit that covers all three sites is the Bullards-Bandon-Blacklock unit, which is described as containing well-drained and poorly-drained, loamy and sandy soils that formed in marine sediment on marine terraces (SCS, 1989).

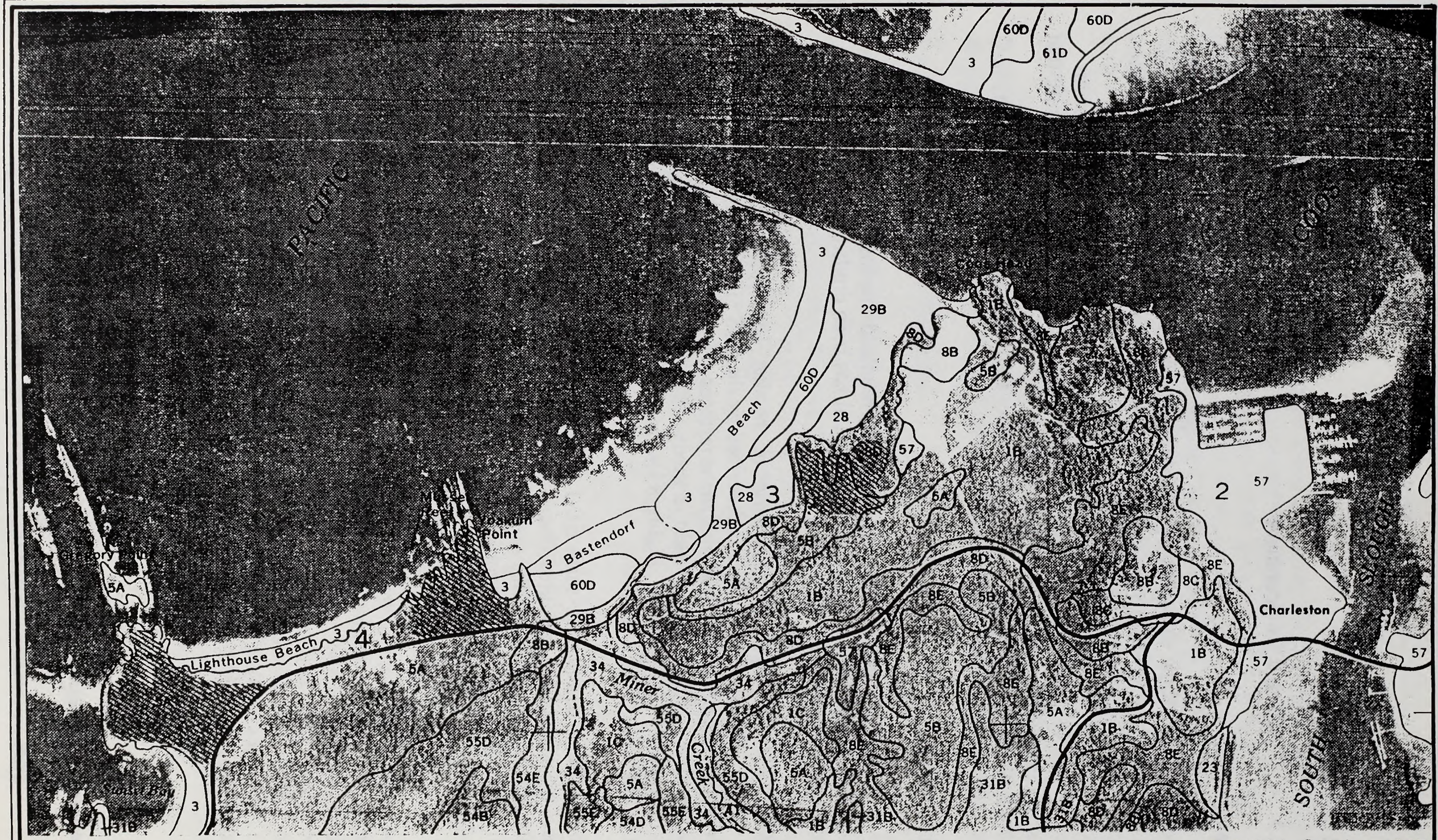
Gregory Point

Soils. This site is located on a prominent coastal headland that historically was part of the Cape Arago Lighthouse Station. The headland has been eroded into cliffs, coves, and inlets by wave action.

The SCS (1989) has mapped one soil series on the site: Blacklock fine sandy loam on 0-3% slopes. The Blacklock series is described by the SCS (1989) as deep, poorly-drained soils in depressional areas on marine terraces. The soils were formed in sandy marine deposits. This series is classed as sandy, mixed, isomesic, orstein, shallow Typic Tropaquods (SCS, 1989). Figure 8 shows the detailed soil map units as mapped by the SCS (1989).

The soil profile is as follows: surface 0-1 inch, a mat of organic litter; surface layer 0-9 inches, black and very dark grey fine sandy loam and loamy fine sand; subsurface layer 9-13 inches, gray loamy fine sand; subsoil 13-15 inches, black mucky loam; subsoil 15-52 inches, mottled, strong brown to yellowish brown, cemented sand; substratum 52-75+ inches, mottled, light olive brown, red, and brown sand (SCS, 1989).

Table 4 summarizes many of the soil characteristics. A cemented soil pan is present at a depth of 16-20 inches below the surface. Permeability of the Blacklock soil is described as moderate above the cemented layer, very slow through the cemented layer, and moderately rapid below that layer. Runoff is very slow, and the hazard of water erosion is slight. The water table is described as fluctuating from 6 inches above the surface (in depressions) to 30 inches below the surface from October to May. The depth to bedrock is 3-10 feet.



7941202 October 1995

Soil mapping units for the alternative site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon (Soil Conservation Service, *Soil Survey of Coos County, Oregon,* 1:20000, 1989).

FIGURE
8

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Table 4. Characteristics for Soils Mapped on the Alternative Sites*

	Gregory Point and Yoakam Point 5A – Blacklock fine sandy loam, 0 to 3 % slopes	Coos Head 5B – Blacklock fine sandy loam, 3 to 7 % slopes	Coos Head 8D – Bullards sandy loam, 12 to 30 % slopes
Limitations on Building Site Development (rating; reasons)			
Shallow excavations	Severe; cemented pan, cutbanks cave, ponding	Severe; cemented pan, cutbanks cave, ponding	Severe; cutbanks cave, slope
Dwellings w/o basements	Severe; ponding	Severe; ponding	Severe; slope
Dwellings with basements	Severe; cemented pan, ponding	Severe; cemented pan, ponding	Severe; slope
Small commercial buildings	Severe; ponding	Severe; ponding	Severe; slope
Local roads and streets	Severe; ponding	Severe; ponding	Severe; slope
Lawns and landscaping	Severe; thin layer	Severe; thin layer	Severe; slope
Limitations on Sanitary Facilities (rating; reasons)			
Septic Tank Absorption Fields	Severe; cemented pan, ponding	Severe; cemented pan, ponding	Severe; slope
Features Affecting Water Management			
Drainage	ponding, cemented pan	ponding, cemented pan, slope	deep to water
Irrigation	ponding, cemented pan	ponding, cemented pan, slope	slope, soil blowing, droughty
Terraces and diversions	ponding, cemented pan, too sandy	ponding, cemented pan, too sandy	slope, soil blowing
Grassed waterways	wetness, cemented pan	wetness, cemented pan	slope, droughty
Limitations on Recreational Development			
Paths and trails	Severe; ponding	Severe; ponding	Moderate; slope
Physical and Chemical Properties			
Shrink–swell potential	low	low	low
Erosion factor K (inches, K)	0–9, 0.2; 9–15, 0.15; 52–75, 0.17	0–9, 0.2; 9–15, 0.15; 52–75, 0.17	0–7, 0.2; 7–41, 0.17; 41–60, 0.24
Wind erodibility	not available or not estimated	not available or not estimated	3 (highly erodible)
Water and Soil Features			
Hydrologic group	D (high runoff potential when thoroughly wet)	D (high runoff potential when thoroughly wet)	B (low to mod. runoff potential when thoroughly wet)
Flooding	none	none	none
High water table			
depth	+0.5–2.5 feet	+0.5–2.5 feet	greater than 6 feet
kind	perched	perched	no concern or data not estimated
months	October–May	October–May	no concern or data not estimated
Soil Features			
Depth to bedrock	greater than 60 feet	greater than 60 feet	greater than 60 feet
Cemented pan			
depth	12–20 inches	12–20 inches	no concern or data not estimated
thickness	thin	thin	no concern or data not estimated

*Adapted from the Soil Survey of Coos County, Oregon, Soil Conservation Service, 1989.

The soil survey denotes that several other soils may be present within the Blacklock unit. Two of these are Bandon and Bullards soils, which are both described as deep, well-drained sandy loam. A soil that may be present is described as being similar to the Blacklock but lacks the cemented layer and has a clayey substratum (SCS, 1989).

Topography. The general topography of the area is reflective of the regional geologic and soil setting described previously.

The site is approximately 60 feet above sea level and is situated on a narrow headland that juts northwest into the ocean. It is bordered on the north, west, and south sides by steep cliffs of eroded sandstone that drop into the ocean and to the east by Cape Arago Highway. Site topography is predominantly flat and slopes toward the ocean. A small drainage slopes gradually toward the southwest corner of the site along Cape Arago Highway (SMH, 1992). Figure 1 shows the topography of the site and surrounding area.

Yoakam Point

Soils. This site is located along the coast and approximately one-half mile northeast of Gregory Point. The SCS (1989) has mapped the same soil series at Yoakam Point as at Gregory Point, Blacklock fine sandy loam on 0-3% slopes. All descriptions of soils for Gregory Point can be applied Yoakam Point.

Topography. The topography of Yoakam point is very similar to that of Gregory Point. The site is bordered to the north by steep, eroded sandstone cliffs that drop into the ocean or onto the beach, to the west by land similar to the interior of the site, to the east by dune complex, and to the south by Cape Arago Highway. A small drainage runs south to north across the site.

Coos Head

Soils. This site is located approximately one-half mile northeast of Yoakam Point. The site is located slightly inland, in comparison to the other two sites, and about 80 feet above sea level. It is bordered to the north and west by unconsolidated sand behind the beach, and to the east and south by land similar to the interior of the site.

The SCS (1989) has mapped two soil series on the site: Blacklock fine sandy loam on 3-7% slopes and Bullards sandy loam on 12-30% slopes. Figure 8 shows the soil map units as mapped by the SCS (1989). The Blacklock soil is mapped on approximately 40 percent of the site and the Bullards soil is mapped on the remainder. The Blacklock series is described by the SCS (1989) as deep, poorly-drained soils formed in sandy marine deposits and present in depressional areas on marine terraces. The Bullards series is described as deep, well-drained soil formed in mixed eolian and marine deposits and present on dissected marine terraces (SCS, 1989). The Bullards series is classed as coarse-loamy, mixed, mesic Typic Haplorthods (SCS, 1989).

The soil survey reports that several other soils may be present within the two soil units. Within the Blacklock soil unit small areas of Bandon sandy loam, Bullards sandy loam, and Heceta fine sand may occur. Within the Bullards soil unit; Bandon sandy loam, Templeton silt loam, and Blacklock fine sandy loam may occur in small areas (SCS, 1989).

The soil profile for the Blacklock fine sandy loam on 3-7% slopes is nearly identical to the soil profile for Blacklock fine sandy loam on 0-3% slopes, which was described in the discussion of Gregory Point.

Table 4 summarizes many of the Bullards soil characteristics. Permeability of the soil is described as moderate, runoff is medium, the hazard of water erosion is moderate, and the hazard of soil blowing is severe. The water table is greater than six feet below the surface and the depth to bedrock is greater than 60 feet (SCS, 1989).

The soil profile for the Bullards series is as follows: surface 0-3 inches, a mat of undecomposed organic matter; surface layer 0-7 inches, very dark grayish brown sandy loam; subsoil 7-41 inches, dark reddish brown, dark brown, and strong brown gravelly sandy loam; substratum 41-60+ inches, yellowish brown sand (SCS, 1989).

Topography. The site topography is undulating with maximum elevation differences of approximately 40 feet and an average variation of 20 feet. Three or four drainages dissect the site and slope downward to the north. The site is bordered to the north and east by 30- to 80-foot cliffs, to the east by a paved road, and to the south by a gravel road (Bruce Hollen, pers. comm.).

3.1.2.2 Environmental Consequences

Many of the construction and operation issues discussed in this section are based on information in the Coos County Soil Survey (SCS, 1989). At all three sites, the soil survey describes a number of soil limitations related to the cemented soil pan and resultant ponded surface water.

Construction and operation of the proposed interpretative center would have certain environmental consequences that are common to all sites evaluated. The most apparent impacts are those that may occur during site development. In this regard, all sites would require clearing and grading work in paved areas and for buildings. Clearing the site temporarily increases the potential for erosion during the construction period. Erosion potential is affected by a number of factors, including soil characteristics, vegetative cover, topography, and climate. Based upon a review of conceptual plans, the completed site works would involve buildings, paved areas and landscaped areas, which, when built, restore soil protection against erosion. The proposed sites for the Bal'diyaka Interpretive Center are relatively flat, and this factor reduces the potential for erosion. Impacts to the topography on any of the sites will be minimal. The Bal'diyaka Interpretive Center development would not require major earthwork, i.e. large cuts and fills; instead, near-grade roadways, parking, and buildings are envisioned with the intent of minimizing impacts on the existing ground conditions.

Gregory Point

Construction. Site development will have to be designed taking into account several activities that have been rated as having severe soil limitations by the Soil Conservation Service. A severe rating means that soil properties or site features are so unfavorable or so difficult to overcome that special design, increases in construction costs, and possibly increased maintenance would be required. Special feasibility studies may be required where the soil limitations are severe (SCS, 1989). Table 4 summarizes many of the soil characteristics. Limitations exist for shallow excavations (less than 6 feet) because of the cemented pan, cutbanks caving in, and ponding. Development of small commercial buildings and local roads and streets (all-weather surface) has severe limitations because of ponding. Development of lawns and landscaping has severe limitations because the soil layer is too thin.

Septic tank absorption fields are rated as having severe limitations because of the cemented soil pan and surface ponding. In addition, recreational development limitations are listed as severe for paths and trails because of surface ponding.

A seasonal, perched, high-water table is listed as being present from October through May ranging in depth from 0.5 foot above the surface to 2.5 feet below the surface (SCS, 1989). As mentioned in the introduction to this section, surface ponding was observed in limited areas and was usually associated with surface drainages (Fred Small, pers. comm.).

The shrink-swell potential is rated as low, indicating that volume changes in the soil related to gain or loss of moisture are unlikely to damage buildings, roads, and other structures (SCS, 1989).

The erosion factor K indicates the susceptibility of a soil to sheet or rill erosion. Values for K range from 0.02 to 0.69 with higher values indicating greater susceptibility to erosion. The K factors measured for the soil mapped at the site were in the lower one third of the potential range of values, indicating low susceptibility to sheet or rill erosion. Those values were as follows: $K=0.2$ for 0-9 inches, $K=0.15$ for 9-15 inches, and $K=0.17$ for 52-75 inches (SCS, 1989).

Despite these ratings, preliminary geotechnical site investigation by Squier Associates for this EIS suggests that suitable foundation conditions exist at each of the sites (Gary Peterson, pers. comm.). Visits to each of the sites revealed only limited areas of ponded water and these were associated with surface drainages (Fred Small, pers. comm.).

Operation. Management concerns for woodlands are rated as severe for windthrow, the uprooting and tipping over of trees by the wind, because tree roots are restricted by the cemented layer (SCS, 1989). A severe rating means that many trees may be expected to be blown down during periods of soil wetness and moderate or strong winds. The Oregon Department of Forestry confirmed that windthrow is a hazard in the area. Windthrow could be expected to occur if development of the site created large openings within mature stands of trees (Dave Taylor, pers. comm.).

Drainage of surface and subsurface water is negatively affected by the ponding of surface water and the cemented soil pan (SCS, 1989). The major impact would be on trails. Trails would be built above the surface elevation or constructed to facilitate drainage away from their surfaces.

Yoakam Point

Construction. The SCS (1989) has mapped the same soil series at Yoakam Point as at Gregory Point, Blacklock fine sandy loam on 0-3% slopes. All descriptions of construction related to environmental consequences for the Gregory Point site can be applied to the Yoakam Point site. Table 4 summarizes many of the soil characteristics. Preliminary geotechnical site work by Squier Associates suggests that suitable foundation conditions exist on the site (Gary Peterson, pers. comm.) and site visits revealed only limited areas of surface ponding (Fred Small, pers. comm.).

Operation. Management concerns for woodlands are rated as severe for windthrow. The discussion presented for Gregory Point is also applicable to this site.

Coos Head

Construction. As discussed previously, the SCS (1989) has mapped two soil series on the site: Blacklock fine sandy loam 3-7% slopes and Bullards sandy loam 12-30% slopes. The Blacklock soil is mapped on approximately 40% of the site and the Bullards soil is mapped on the remainder. The discussion of environmental consequences for the Coos Head site covers each of the two soil series separately.

As shown in the preliminary site plan (Figure 5), the interpretive center would be built entirely on the Blacklock soil unit and the parking lot would be built on both soil units. Preliminary geotechnical site work by Squier Associates suggests that suitable foundation conditions exist on the site (Gary Peterson, pers. comm.).

Blacklock fine sandy loam with 3-7% slopes predominates on the southern half of the site. Table 4 summarizes many of the soil characteristics. All descriptions of construction-related environmental consequences for the Gregory Point and Yoakam Point sites can be applied to this portion of the Coos Head site.

Bullards sandy loam with 12-30% slopes predominates on the north half of the site. All of the following discussion refers to this soil.

Site development at Coos Head will have to be designed taking into account the soil limitation ratings of the SCS. Building site development limitations are rated as severe for shallow excavations (less than 6 feet), small commercial buildings, local roads and streets (all-weather surface), and lawns and landscaping. The severe rating is given for all listed activities because of slope. In addition, cutbanks caving in is listed as a restrictive soil feature for shallow excavations. As stated previously, a severe rating means that there would be special construction and operation requirements and special feasibility studies may be required (SCS, 1989).

Sanitary facility limitations are rated as severe for septic tank absorption fields because of the slope.

Recreational development limitations on the Bullards soil are listed as moderate for paths and trails because of slope. A moderate rating means that limitations can be overcome or alleviated by planning, design, or special maintenance (SCS, 1989).

The shrink-swell potential is rated as low, indicating that volume changes in the soil related to gain or loss of moisture are unlikely to damage buildings, roads, and other structures (SCS, 1989).

The erosion factor K indicates the susceptibility of a soil to sheet or rill erosion. Values for K range from 0.02 to 0.69 with values indicating greater susceptibility to erosion. The K factors measured for the soil mapped at the site were within or near the lower one third of the potential range of values, indicating low susceptibility to sheet or rill erosion. Those values were as follows: K=0.2 for 0-7 inches, K=0.17 for 7-41 inches, and K=0.24 for 41-60 (SCS, 1989).

This soil is grouped in Hydrologic Soil Group B. Soils in this group have a moderate infiltration rate and therefore low to moderate runoff potential when wet (SCS, 1989).

Operation. Windthrow potential in woodlands are rated as severe in the Blacklock soil unit and as moderate in the Bullards soil unit. The discussion of windthrow for the Gregory Point is also applicable here.

No Action Alternative

Under this alternative, no interpretive center would be constructed, and no impacts associated with construction or operation of the interpretive center would occur.

3.1.2.3 Mitigation Measures

All Sites

During construction, erosion potential can be reduced by implementation of Best Management Practices (BMP) through an erosion and sediment control plan (see Appendix). The Oregon Department of Environmental Quality (DEQ) would require a construction erosion control permit that would describe the erosion control measures to be carried out during construction.

Excavation and backfilling would be planned for the drier months of the year. The time span between site preparation and construction would be minimized to prevent exposure of soils. Areas expected to be exposed for long periods of time, even during summer months, would be stabilized by accepted methods.

3.1.3 GROUNDWATER

3.1.3.1 Affected Environment

Regional

Groundwater in the vicinity of the three subject sites is generally found in two zones; a shallow perched zone and a deeper regional aquifer. The shallow perched zone is controlled by the unconformable contact between the marine terraces and the underlying sedimentary units. The sedimentary units are generally orders of magnitude less permeable than the loosely consolidated marine terraces and therefore water would build up on these contact surfaces. The shallow, perched groundwater drains from exposures along the steep perimeter slopes.

The regional deep aquifer is found at depths closely approximating sea level and generally within the sandstones. Yield from this aquifer is estimated to be medium to low, up to about 50 gallons per minute. Groundwater produced by wells in the vicinity of the sites is for domestic water use. Very little data is available for the inherent groundwater chemistry.

Water well logs on file with the Oregon Water Resources Department (WRD) in Salem, Oregon were reviewed. The U.S. Geological Survey (USGS) topographical coordinates for the subject sites are Sections 3 and 4 of Township 26 South, Range 4 West, from the Willamette Meridian (T26S R4W WM). The boundary between Sections 3 and 4 closely approximates the boundary between Yoakam Point and Bastendorff Beach. Section 4 is the westernmost and includes Gregory Point and Yoakam Point. Four water wells, and a deepening notice for one of those four, were on file for Section 3 T26S R4W WM. Only one water well log was on file for Section 4 T26S R4W WM. Due to lack of information on the water well logs, the exact locations of the wells can not be confirmed. Three of the four wells in Section 3 T26S R4W WM are completed in fine-grained materials at about depths 100-147 feet and the fourth was completed in sandstone at about depth 80 feet. The one well in Section 4 T26S R4W WM was also completed in sand at about depth 80 feet.

Gregory Point

Numerous groundwater seeps were observed on the exposed perimeter bluffs at the contact between the marine terraces and the underlying Coaledo sandstones. These seeps are evidence of the presence of the shallow perched groundwater zone. The boggy area observed at the base of the small depression located in the southwestern portion of the site also is attributed to shallow perched groundwater.

An onsite sand filter-type, sewage treatment system exists at the U.S. Coast Guard facility currently located at Gregory Point. The current system reportedly replaced a former system that had failed and information on the subsurface impact of the failed system has not been found.

The sewage treatment system for the Oregon State Park located south of Gregory Point is located east of the subject site. This sewage treatment system may be located in a position hydraulically upgradient of the Gregory Point site. There is potential for impact from this site, although due to the significant distance from the site, it is unlikely that an adverse consequence has occurred.

Yoakam Point

A significant number of seeps were not observed at the contact between the marine terrace deposits and the underlying bedrock along the headland bluffs. The road cut along the Cape Arago Highway has intercepted shallow groundwater, which seeps from the cut slopes. Hence, the upgradient source for a shallow, perched aquifer has been partially truncated. Localized minor seeps were observed emitting from joints and fractures within the sedimentary bedrock above the surf line. Only minor water seeps were observed.

No structures or evidence of past development currently exist at Yoakam Point, therefore, it appears that no onsite activities may have adversely impacted the groundwater. In addition, there did not appear to be significant developed use of the land hydraulically upgradient of the site.

Coos Head

Numerous seeps were also observed on the exposed perimeter at the contact between the marine terraces and the Tunnel Point sandstones. These seeps are also evidence of the presence of the shallow, perched groundwater zone.

No structures currently exist at the Coos Head site, therefore, it appears that there are no existing features that may impact the groundwater. However, there are a number of residential structures on property that adjoins the subject site, to the north, that may have onsite septic or fuel storage systems. Property to the north can be presumed to be hydraulically upgradient of the site.

Monitoring well records on file with WRD include four monitoring wells placed on the Coos Head Air National Guard facility. The depths to water for the four monitoring wells ranged from 13.5 feet to 64 feet. The monitoring wells were completed in a fossiliferous dark green sand, which most likely represents a sandstone bedrock unit.

3.1.3.2 Environmental Consequences

Regional

Considering that the proposed development would be constructed to current building codes, it is envisioned that the site facilities would be provided with potable water from an outside source. Further, it is not envisioned that buried fuel tanks would be installed, nor that storage of significant quantities of potentially hazardous materials would occur. Hence, the potential for adverse environmental consequences to groundwater that would result from the proposed development is restricted primarily to accidental releases that could result from motor vehicles. Additional potential sources of contamination would include surface runoff from parking and driving areas and onsite septic systems. Considering accidental spillage from vehicles, this risk is somewhat higher during construction when soil is directly exposed. During operation of the facility, an accidental release would likely be captured by the storm drainage system, which should be designed to allow containment of such a spill. Based on it's proximity to the surface and the relatively high permeability of the marine terrace sands, the shallow groundwater is readily susceptible to contamination.

The location of the sites on ocean-front properties places each of the sites at the extreme downgradient position, hence no use of groundwater by others is likely within the marine terrace sands. For this reason, the consequence of contamination would likely be confined to the site unless release to the ocean occurred. Construction of the Bal'diyaka Interpretative Center at any of the potential sites should not impact the groundwater below the site.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction on operation of the center would occur.

3.1.3.3 Mitigation Measures

Potential mitigation measures include the following:

- Use alternative fuels or methods for fuel storage other than liquid petroleum products and underground storage.
- Plan to prevent or respond to spills by doing the following:
  - properly designing secondary containment structures,
  - properly labelling containers,
  - restricting the use of large quantities of petroleum fuels or listed hazardous substances,
  - maintaining spill control materials, such as sorbents and oleophyllic pads.

3.1.4 SURFACE WATER

3.1.4.1 Affected Environment

Regional Water

Major regional streams that drain southern Coos County are the Coquille and Coos Rivers (Figure 1). The three sites are located on a section of coastline that is composed of a series of small watersheds that drain directly into the ocean. USGS topographic maps of the area show that streams are located near, but outside, the watersheds of two of the sites. Big Creek is located approximately one-half mile south of Gregory Point and enters the ocean at Sunset Bay State Park. Miner Creek is located about one-third of a mile east of Yoakam Point. Additionally, a small unnamed stream is located approximately one-quarter mile east of Yoakam Point. All of these streams likely receive runoff from Cape Arago Highway.

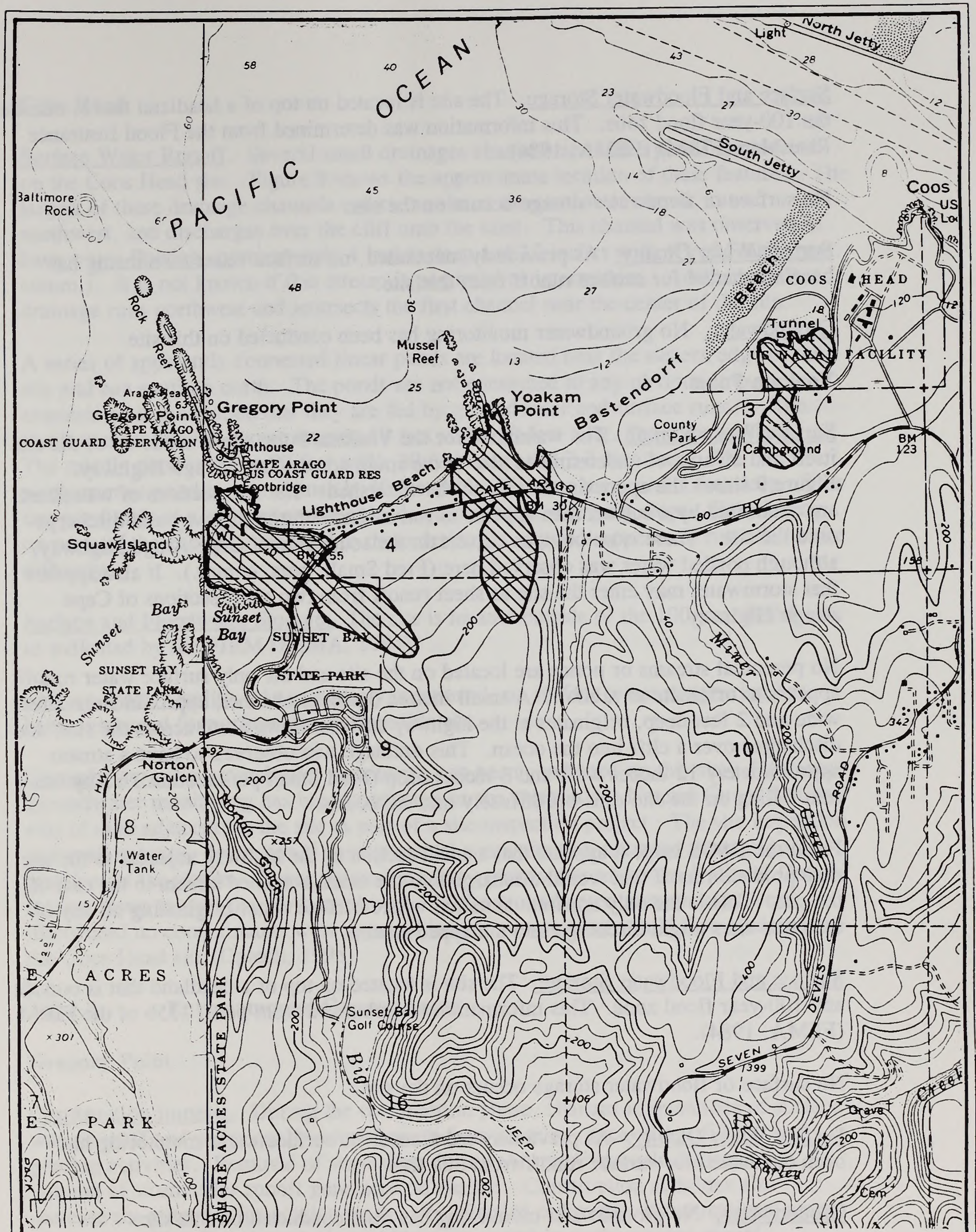
No surface water monitoring has been conducted at any of the sites. The only known groundwater monitoring in the immediate area was conducted at the Oregon Air National Guard station adjacent to the Coos Head site.

No special state water quality regulations would be associated with any of the sites as long as they are considered zero discharge sites (Pam Blake, pers. comm.). Zero discharge sites discharge only stormwater runoff; sewage is treated off-site in a municipal system or on-site in a treatment system (not a septic system).

Gregory Point

Surface Water Runoff. The watershed for the Gregory Point site is composed of the site itself and an area of undetermined size to the southeast across Cape Arago Highway. Figure 9 shows the approximate area of the watershed. The two portions of watershed are connected by a culvert that runs underneath the highway and discharges onto the site. No perennial streams or ponds are located on the site and the only surface water runoff appears to originate as rainfall.

The site slopes gradually to the northwest (toward the ocean). Surface water entering the site via the highway culvert flows into a small drainage located in the southwest part of the site and discharges onto the beach at Sunset Bay State Park. This drainage was observed to contain a stream approximately 2 inches deep and 12 inches wide (Fred Small, pers. comm.). Otherwise, rainfall runs off the site diffusely into the ocean. All other surface water (running toward the site) is intercepted by drainage ditches along Cape Arago Highway and directed away from the site.



Approximate watersheds areas at Gregory Point, Yoakam Point, and Coos Head for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE 9

SRI/SHAPIRO INCORPORATED

Surface and Floodwater Storage. The site is located on top of a headland that is outside the 100-year flood zone. This information was determined from the Flood Insurance Rate Map (FIRM) (FEMA, 1984).

No surface or floodwater storage occurs on the site.

Surface Water Quality. As previously mentioned, no surface water monitoring has been conducted for surface runoff from this site.

Groundwater. No groundwater monitoring has been conducted on this site.

Yoakam Point

Surface Water Runoff. The watershed for the Yoakam Point site is made up of the site itself and an area of undetermined size to the south across Cape Arago Highway. Figure 9 shows the approximate area of the watershed. The two sections of watershed are connected by a culvert than appears to run underneath the highway and discharge onto the site. There is no obvious culvert on the south side of Cape Arago Highway, although ponded water was observed here (Fred Small, pers. comm.). It also appears that stormwater may enter the site as sheet runoff from two short sections of Cape Arago Highway.

No perennial streams or ponds are located on the site and the only surface water runoff appears to originate as rainfall. A small incised drainage channel, approximately 2 feet wide and 2 feet deep, originates at the highway culvert, flows north across the site, and discharges over a cliff into the ocean. This drainage was observed to have a stream approximately 12 inches wide and 3 inches deep (Fred Small pers. comm.). Any other rain falling on the site runs off diffusely into the ocean.

From the USGS map, it appears that a small section of the highway adjacent to the site may produce runoff that would discharge into the small unnamed stream to the east of the site. This is the only apparent situation where surface water originating on any of the three sites might discharge into a mapped stream.

Surface and Floodwater Storage. The site is located on top of a headland that is outside any 100-year flood zone. This information was obtained from panel 135b of the FIRM (FEMA, 1984).

No surface or floodwater storage occurs on the site.

Surface Water Quality. As previously mentioned, no surface water monitoring has been conducted for surface runoff from this site.

Groundwater. No groundwater monitoring has been conducted on this site.

Coos Head

Surface Water Runoff. Several small drainages channels and three ponds are located on the Coos Head site. Figure 9 shows the approximate location of these features. The largest of these drainage channels enters the site at the southwest corner, runs northwest, and discharges over the cliff onto the sand. This channel was observed to have water flowing approximately 4 inches deep and 12 inches wide (Fred Small, pers. comm.). It is not known if this stream is perennial or intermittent. Another small drainage runs northwest and intersects the first channel near the center of the site.

A series of apparently connected linear ponds are located near the eastern edge of the site and run south to north. The ponds are not connected to any obvious stream channels so it is assumed that they are fed by groundwater and surface runoff. The southernmost pond is approximately 10 feet wide, 30 feet long, and 4 inches deep. The middle pond is about 20 feet wide, 30 feet long, and 2-3 feet deep. The northernmost pond is approximately 40 feet wide, 300 feet long, and 3 feet deep. This last pond ends at a seepage area that leads onto a steep, slumping slope. Rain falling on parts of the site not connected to these drainages or ponds appears to run off the site diffusely.

Surface and Floodwater Storage. The site is located outside of the 100-year flood zone as indicated by the FIRM (FEMA, 1984).

Surface Water Quality. As previously mentioned, no surface water monitoring has been conducted for surface runoff from this site.

Groundwater. No groundwater monitoring has been conducted on this site. However, groundwater monitoring has been conducted on the Oregon Air Natural Guard Station east of (and adjacent to) the site as part of a site-inspection project. The site inspection was undertaken to determine if environmental contamination occurred through past practices at the station. It was determined that groundwater under the National Guard Station flows toward the north-northwest. While groundwater contaminants were discovered no contaminants were detected in groundwater that would flow underneath the Coos Head site (Optech, 1995).

3.1.4.2 Environmental Consequences

Gregory Point

Construction Impacts. During the construction phase, changes in quantities of surface water runoff and water quality would result from clearing, excavating, filling, and grading activities. Removal of vegetation during construction could increase the volume of stormwater runoff generated on the site. Construction activities also increase the potential for erosion on the site. Eroded sediments, if not retained onsite by erosion and sediment control, could be transported in surface water runoff.

Because the water table is at or near the surface year-round, any necessary excavations could extend into shallow groundwater. Excavation into groundwater would require dewatering. Controlling water extracted during dewatering operations by using BMPs would ensure that no erosion would occur as a result of water flowing over soils (see Appendix). With implementation of BMPs during construction, adverse effects are not expected to be significant.

The Oregon DEQ was contacted regarding applicable construction stormwater regulations. A storm water construction permit is required for all projects where greater than 5 acres will be disturbed by construction (Andy Ullrich, pers. comm.). The master plan (SMH, 1992) estimated that the buildings, outdoor interpretive areas, roads, parking, and associated landscape buffers would total 6-7 acres. Therefore, a storm water construction permit would be required. The mitigation measures to be used during construction are discussed in a subsequent section of this EIS and would be fully described in any construction stormwater permit.

Operation Impacts. Operation of the proposed interpretive center would alter the surface water runoff and infiltration characteristics of the project site. As described in the Soils section of this EIS, much of the site contains soils that have a cemented pan and are moderately permeable, creating a situation where surface water is often ponded and the water table is at or near the surface for much of the year. Therefore, the creation of impermeable surfaces will cause limited changes in the surface runoff patterns.

Operation of the proposed center would also alter the surface water quality characteristics of stormwater runoff. Stormwater runoff from developed areas typically contains pollutants that vary with the nature of the activities occurring on these sites. The major constituents of concern are heavy metals (typically lead, zinc, copper, and cadmium) and oil and grease generated by operation of vehicles on roadways and in parking areas. Surface water runoff would be collected and treated onsite by a stormwater management system. The system would make use of biofiltration swales that would control water runoff, prevent erosion, and improve water quality. Additional water quality treatment would be provided by oil/water separators that would be installed throughout parking lot areas. Runoff from the parking lots would pass through the oil/water separator prior to being discharged to the biofiltration swales. Treated stormwater would be discharged to existing drainage channels on site.

Biofiltration swales employ several physical, chemical, and biological mechanisms in treating stormwater runoff. These systems remove solids, nutrients, metals, organics, and microorganisms from stormwater. Reduction in solids is accomplished through settling or sedimentation. Many other constituents in stormwater, which are attached to particulate matter are removed from the water along with the solids. This includes metals, organic matter, and nutrients. Biofiltration is particularly effective in removing metals through sedimentation and filtration of solids, and absorption of dissolved metals in the organic layers of the swale (Horner, 1988).

The proposed development would not change the elevation of the site relative to any flood zones. Therefore, there would be no change to surface and flood water storage.

The creation of impervious surfaces as a result of development would reduce the amount of rainwater infiltration and shallow groundwater flow. However, as discussed previously, the creation of impervious surfaces would have a minor impact on a site containing soils that are only moderately permeable, where the water table is at or near the surface much of the year, and water is often ponded.

Yoakam Point

Because of the similarity of Yoakam Point and Gregory Point, the discussion of environmental consequences related to construction and operation at Gregory Point can be applied to this site.

Additionally, as state-owned property, the site falls under the Oregon Forest Practices Act if merchantable timber will be cut as part of site development. The Forest Practices Act requires that culverts or bridges be installed over any drainage channels that will be crossed by logging roads. Roads must be designed to protect drainage channels and erosion control measures must be undertaken (Dave Taylor, pers. comm.).

Coos Head

The environmental consequences related to construction and operation at Gregory Point can also be applied to the Coos Head site.

The Coos Head site contains two soil units as mapped by the SCS (1989): Blacklock fine sandy loam on 3-7% slopes and Bullards sandy loam on 12-30% slopes. The Bullards soil is described as being highly wind erodible. Construction on this soil might require the implementation of additional erosion control measures.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.4.3 Mitigation Measures

Surface Water Runoff -- All Sites

During construction of the proposed interpretive center, erosion and sedimentation would be controlled through the use of BMPs incorporating design criteria presented in *Recommended Best Management Practices for Storm Water Discharges* (Oregon DEQ, 1993) (see Appendix), *Erosion/Sedimentation Control Plans: Technical Guidance Handbook* (Clackamas County, 1991), and the *Stormwater Management Manual for the Puget Sound Basin* (Washington Department of Ecology, 1992).

A grading, drainage, erosion, and sedimentation plan would be implemented during the grading and construction phases of the project. BMPs in such a plan would include the following:

- Minimizing the extent of the area exposed at any one time and the duration of exposure;
- Stabilizing and protecting disturbed areas as soon as possible;
- Keeping runoff velocities low by maintaining short slopes and low gradients while grading the site;
- Protecting disturbed areas from runoff;
- Retaining sediment within the site area, either by filtering runoff or by detaining runoff, so that sediment will settle out;
- Implementing a thorough maintenance program to ensure all control practices are working properly; and
- Controlling water from dewatering operations.

Provided that the BMPs are properly designed and implemented, sedimentation impacts on and offsite are not expected to be significant.

Surface and Floodwater Storage -- All Sites

No impacts on the floodplain would be created by the project. Therefore, no related mitigation measures would be undertaken.

Surface Water Quality -- All Sites

As with surface water runoff mitigation, the primary method of mitigating impacts associated with construction activities is proper implementation of BMPs. The BMPs would control erosion and ensure that sediments are retained onsite (see Appendix). During construction of the project, potential releases of pollutants associated with construction activities could be controlled by practicing good "housekeeping." Such practices would include the following:

- Maintain construction equipment and vehicles so they do not leak fuels or lubricants;
- Specify a staging area for all vehicle maintenance activities that is well away from all drainage courses;

- Store petroleum products and building materials that could contaminate runoff in a covered area. Create an impervious berm around the perimeter of the storage area, and line the area with a double layer of plastic or similar material;
- Cover and maintain dumpsters;
- Use only recommended amounts of paints and other materials;
- Properly dispose of all oil, oily wastes such as cans, rags, and paper dropped in oil;
- Keep fresh concrete and cement mortars out of gutters, storm drains, and streams;
- Service and maintain portable toilets;
- Dispose of cleared vegetation properly;
- Post information for procedures in case of spills; and
- Immediately clean up any spills by removal of affected soil and proper disposal at an approved site.

The stormwater management system would provide water quality treatment primarily through the use of biofiltration swales that would allow particulate pollutants to settle out and dissolved pollutants to be biologically assimilated. Final bioswale design would incorporate criteria outlined in *Biofiltration Swale Performance, Recommendations, and Design Considerations* (Metro, 1992). Maintenance of the stormwater management system, including vegetation harvesting and maintenance of oil/water separators, would be important to ensure its proper functioning.

Groundwater -- All Sites

Since any groundwater impacts are likely to be minimal, no related mitigation measures will be undertaken.

3.1.5 VEGETATION

This section discusses vegetation communities found within the three proposed project sites. Site investigations were conducted on May 25-26 and June 13-14, 1995 and recorded observations pertaining to plant community types, distinctive structural and habitat features, and drainage patterns. The initial field work has been augmented by aerial photograph interpretation.

3.1.5.1 Affected Environment

Regional

Plant communities along the central Oregon coastline and encompassing the proposed project sites are within the Sitka spruce vegetation zone, an assemblage of species extending inward just a few miles to the western foothills of the Coast Range (Franklin and Dyrness, 1973). These communities are ultimately dominated by a Sitka spruce overstory, if left undisturbed for a sufficient period of time. In actuality, the wide range of existing community types found along the immediate coastline attest to the fact that the potential old growth Sitka spruce community is seldom encountered, having been subject to periodic natural and human disturbances. Natural disturbances such as high winds, fires, and landslides have historically maintained a mosaic of early to late seral communities. Human activities in the last century, however, have radically accelerated the frequency of disturbance through extensive logging and coastal strip development. As a result, most coastal areas are presently vegetated by younger mixed stands of spruce, shore pine, and red alder, have developed thick shrub/sapling cover, or are dominated by herbaceous species. For a detailed description of different habitat types in the region, refer to Franklin and Dyrness (1973).

The southern Oregon coast is home to several species of concern that must be addressed relative to the federal and state Endangered Species Acts. The Oregon Natural Heritage Program database printout (ONHP, 1995) lists the following species of concern within a two mile radius of the proposed sites:

Common Name	**Scientific Name**	**Regulatory Status**
pink sand verbena	*(Abronia umbellata ssp. breviflora)*	[Fed C2: ODA LE]
dwarf brodiaea	*(Brodiaea terrestris)*	[ONHP list 2]
salt marsh birds-beak	*(Cordylanthus maritimus* ssp. *palustris)*	[Fed C2: ODA PE]
western bog lily	*(Lilium occidentale)*	[Fed LE: ODA LE]
California sea-lavender	*(Limonium californicum)*	[ONHP list 2]
silvery phacelia	*(Phacelia argentea)*	[Fed C2: ODA C]

Federal	USFWS Candidate List
LE	Listed Endangered
C2	Category 2 Candidate (additional information needed to propose as Endangered or Threatened under ESA)
ODA (State)	Oregon Department of Agriculture
LE	Listed Endangered
PE	Proposed Endangered
C	Candidate for Listing

ONHP (Oregon Natural Heritage Program)

List 2 "species that are threatened, endangered, or possibly extirpated from Oregon, but are more common or stable elsewhere"

Taking into account the habitat preferences of each species, the documented locations of existing populations, habitat features found on each site, and discussions with BLM Coos Bay District (Rittenhouse, pers. comm., 1995), the primary species of concern on these sites is the western bog lily. The lily, documented at several locations in the vicinity of the proposed development sites, is considered most likely to be present. The dwarf brodiaea is also potentially found in these areas, though its status is relatively stable at this time.

Western bog lily. The western bog lily is a federally listed endangered species known to occur in only 31 small, isolated populations within 2 miles of the ocean from the City of Hauser, Oregon to Loleta, California (50 CFR, Part 17). Typical habitats include sphagnum bogs, coastal scrub and prairie, and other poorly drained areas at relatively early stages of succession. Apparently optimum soils are well developed, poorly drained acid ortsteins (such as Blacklock) that are sufficiently podsolized to form a weak to moderate iron pan (Schultz, 1989). The plants generally grow in open areas at the edge of forest or shrub communities; infill of these openings by woody species can threaten the plants' survival by shading and competitive crowding.

Common tree associates of the bog lily include coast pine, Sitka spruce, and willows. Shrubs include wax-myrtle, trapper's tea, Douglas spiraea, twinberry, and salal. Herbaceous associates include Pacific reedgrass, sedges, sphagnum moss, and California pitcher plant.

Individuals and populations of western bog lily are currently being monitored at several locations near the proposed development sites (Rittenhouse, 1994). The exact locations are considered sensitive at this time due to the potential for collecting or other impacts. The difficulty of conducting widespread inventories of the plant means that additional populations in the area may yet be encountered, given its preference for shrub thickets and bogs.

Other species. The remaining species are of little concern for this project since their preferred habitats are either not present on the potential sites, or their status is of relatively low priority. Pink sand verbena *(Abronia umbellata ssp. breviflora)* grows on soft sand beaches just above tide line. Habitat for the plant is not present on the sites themselves, though a few small beaches in the vicinity may provide habitat for the plant. The dwarf brodiaea *(Brodiaea terrestris)* prefers grassland or open woodland from sea level to middle elevations in the mountains. It is more common to the south in California (it is near the northern limit of its range here) and has been recently observed at one of the proposed development sites (Rittenhouse, pers. comm., 1995). Its status warrants continued monitoring. Both saltmarsh birds-beak *(Cordylanthus maritimus* ssp. *palustris)* and California sea-lavender *(Limonium californicum)* are restricted to saltmarsh habitats along the southern Oregon and California coasts.

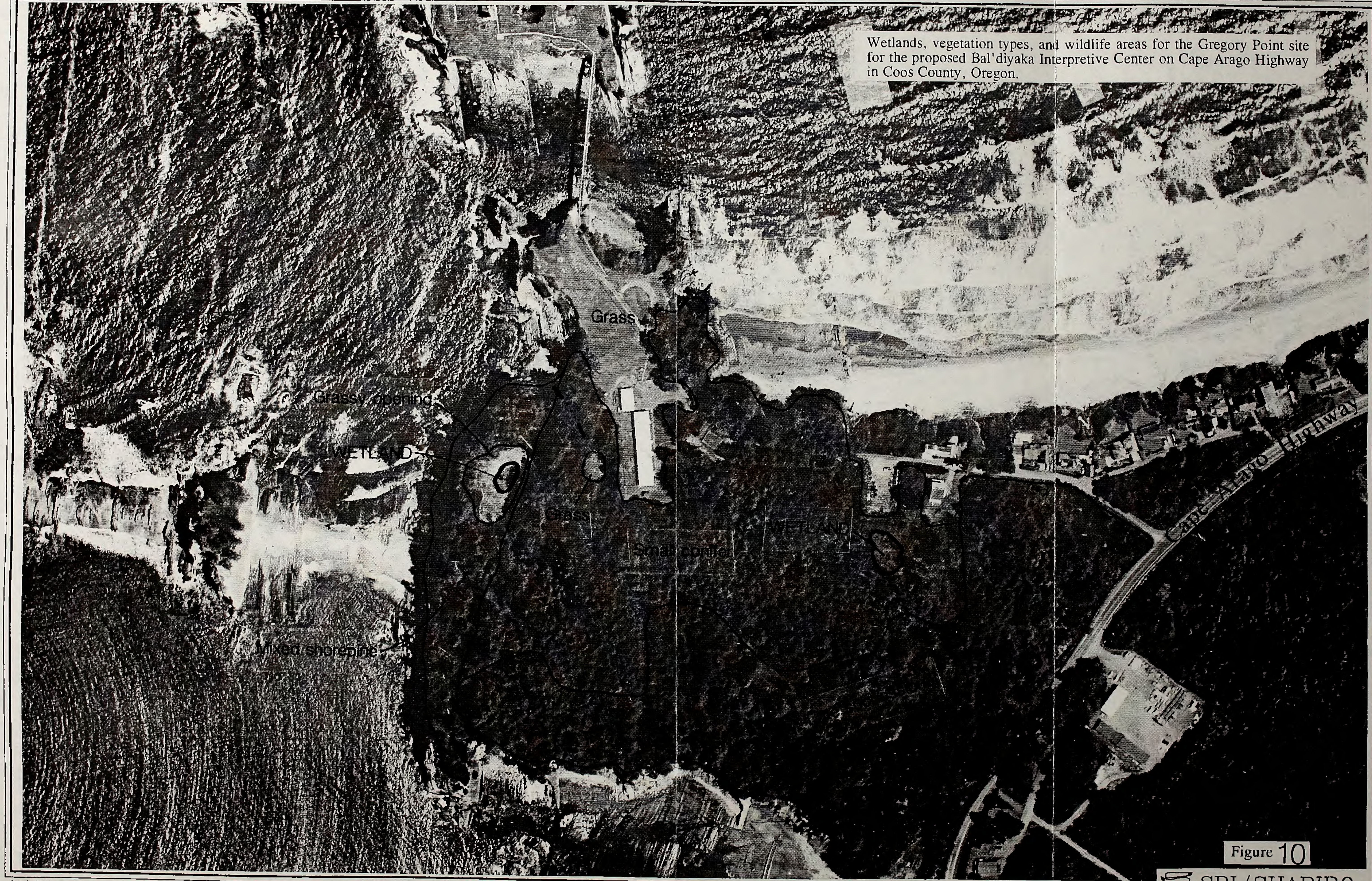
Saltmarsh birds-beak is threatened in California as well as Oregon, whereas the California sea lavender is much more common in California. Both plants inhabit areas above the high tide line, with California sea-lavender generally at a slightly higher position than that of birds-beak. No saltmarsh habitats are present within any of the alternative sites. Silvery phacelia *(Phacelia argentea)* is a federal and state candidate species that grows on sandy bluffs and in dunes close to the ocean. This habitat is extremely limited within the survey sites; its presence is considered highly unlikely.

Numerous additional plant species not included in the ONHP database may be of potential concern on these sites following implementation of survey standards and management guidelines for old growth forests (USDA and USDI, 1994). Survey guidelines for the majority of these species are largely undefined at present, but may require attention at a later time.

Gregory Point

This headland is primarily forested, with the only substantial open areas associated with the Coast Guard facility and headlands along the Point's northern edge (Figure 10). The forest has been impacted in the past by logging activities; however, most portions of the stand appear to have remained undisturbed for well over 50 years, an increasingly rare coastal community. Isolated large spruce (as much as 48 inches diameter at breast height [dbh] or more) indicate that the site was originally thinned (highgraded), not clearcut, allowing some of the original remnant trees to reach a size that helps provide a late successional structural diversity to the stand. More recent logging is evident along the northern margin, where trees were most likely removed in support of Coast Guard development. Trees are generally smaller and closer together in the northwestern corner, whereas most of the site to the south and east contains larger well-spaced trees with a well-developed understory.

Sitka spruce dominates the multilayered overstory, with associated species including Port Orford cedar, red alder, and western hemlock. The Port Orford cedars in the stand appear for the most part to be dead or dying, most likely from the effects of an exotic root rot fungus. The fungus, introduced into Coos County in 1952, has since severely impacted Port Orford cedar populations along the coast (Burns et. al., 1990). The dense shrub understory is dominated by Pacific wax-myrtle, rhododendron, cascara, evergreen and red huckleberries, salmonberry, thimbleberry, twinberry, crabapple, and salal. The wax myrtle and rhododendron attain heights of over 20 feet in some areas, though the densest growth is generally below 10 feet in height. The shrub understory has been relatively undisturbed throughout the site except where foot traffic on unofficial trails leading from the Sunset Bay parking lot has trampled and otherwise opened up the understory. The sparse herbaceous understory is dominated by false lily-of-the-valley, bracken fern, sword fern, and lady fern. Slough sedge and skunk cabbage are primarily restricted to the one drainageway and a minor tributary that ultimately flow into Sunset Bay. In addition, a few small patches of slough sedge are found in isolated low spots and in a forest opening near the northern boundary road. A listing of species observed is presented in Table 5.



Wetlands, vegetation types, and wildlife areas for the Gregory Point site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

Figure 10

Aerial photography from BLM, 1992

7941202 October 1995

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Table 5. **Plant Species Observed on Gregory Point, Yoakam Point, and Coos Head (partial species list compiled from May 23-24 and June 13-14, 1995 site visits)**

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
Trees				
Alnus rubra	red alder	X	X	X
Chaemacyparis lawsoniana	Port Orford cedar	X	X	X
Picea sitchensis	Sitka spruce	X	X	X
Pinus contorta	shore pine	X	X	X
Salix hookeriana	Hooker's willow	--	--	X
Thuja plicata	western red cedar	--	--	X
Tsuga heterophylla	western hemlock	X	X	X
Shrubs				
Cytisus scoparius	Scots' broom	X	--	--
Garrya elliptica	wavy-leaf silk-tassel	X	--	--
Gaultheria shallon	salal	X	X	X
Hedera helix	English ivy	--	X	X
Lonicera involucrata	twinberry	X	X	X
Menziesia ferruginea	fools' huckleberry	--	--	X
Myrica californica	California wax-myrtle	X	X	X
Pyrus fusca	Pacific crabapple	X	--	X
Rhamnus purshiana	cascara	X	X	X
Rhododendron macrophyllum	western rhododendron	X	--	X
Rubus discolor	Himalayan blackberry	X	--	--
Rubus parviflorus	thimbleberry	X	X	X
Rubus spectabilis	salmonberry	X	X	X
Rubus ursinus	Pacific dewberry	--	X	--
Sambucus racemosa	red elderberry	--	--	X
Vaccinium ovatum	evergreen huckleberry	X	X	X
Vaccinium parvifolium	red huckleberry	X	X	--
Herbs				
Achillea millefolium	yarrow	--	X	--
Ammophila arenaria	European beachgrass	X	X	--
Angelica lucida	sea-watch	X	X	--
Anthoxanthum odoratum	spring vernal-grass	--	X	--
Aster sp.	aster	X	X	--
Athyrium filix-femina	lady fern	X	X	X
Bellis perennis	English daisy	--	X	--
Blechnum spicant	deer fern	X	--	X
Boshniakia hookeri	Vancouver groundcone	--	--	X
Bromus sp.	brome grass	--	X	--
Cakile edentula	American searocket	--	X	--
Calamogrostis nutkaensis	Pacific reedgrass	X	X	--
Calochortus tolmiei	Tolmie's mariposa lily	X	--	--

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
Carex obnupta	slough sedge	X	X	X
Carex sp.	sedge	--	--	X
Castilleja sp.	paintbrush	X	X	--
Cirsium sp.	thistle	X	X	--
Dactylus glomerata	orchardgrass	X	X	--
Disporum smithii	fairy lanterns	--	X	--
Dryopteris austriaca	spreading woodfern	X	--	X
Eleocharis sp.	spikerush	--	--	X
Elymus mollis	American dunegrass	--	X	--
Equisetum arvense	field horsetail	X	X	X
Erechtites minima	toothed coast burnweed	X	--	--
Festuca sp.	fescue	X	--	--
Fragaria chiloensis	coast strawberry	X	X	--
Honkenya peploides	seabeach sandwort	--	X	--
Hypochaeris radicata	spotted catsear	X	X	--
Iris tenax	Oregon iris	X	--	--
Juncus lesueurii	salt rush	--	--	X
Juncus spp.	rush spp.	--	--	X
Lathyrus japonicus	beach pea	--	X	--
Ligusticum sp.	lovage	--	X	--
Lolium perenne	perennial ryegrass	--	X	--
Lotus corniculatus	birds'-foot trefoil	--	X	--
Lysichitum americanum	skunk cabbage	X	--	--
Maianthemum dilatatum	false lily-of-the-valley	X	X	X
Oenanthe sarmentosa	water parsley	--	X	X
Plantago lanceolata	English plantain	--	X	--
Plantago maritima	seaside plantain	--	X	--
Polypodium scouleri	Scouler's polypody	X	--	X
Polystichum munitum	swordfern	X	X	X
Pteridium aquilinum	bracken fern	X	X	X
Ranunculus repens	creeping buttercup	--	X	--
Ranunculus sp.	buttercup	--	X	--
Sanicula crassicaulis	Pacific sanicle	--	X	--
Senecio bolanderi	Bolander's groundsel	--	--	X
Sonchus asper	prickly sow-thistle	X	--	--
Trifolium dubium	least hop-clover	--	X	--
Trifolium variegatum	white tip clover	--	X	--
Veronica americana	American speedwell	--	--	X
Viola sp.	violet	--	X	--

X: habitat present
--: habitat not present

On the outer edges of the headland, taller dispersed spruce overstory gives way to a denser growth of low-growing shrubs and adapted trees. Greater wind velocities and salt spray have effectively eliminated species intolerant of these conditions, favoring a dense mix of shore pine, low-growing spruce, salal, silk-tassel, twinberry, and

Himalayan blackberry. Exposed dirt and rock slopes generally support a more transitory community dominated by herbaceous species such as European beachgrass, yarrow, peavine, Angelica, clovers, Iris, and coast strawberry. The headland is essentially isolated from adjacent beach communities except where accessible from Sunset Bay State Park, since steep cliffs and a rocky shoreline subject to wave action greatly restrict the development of terrestrial plant communities.

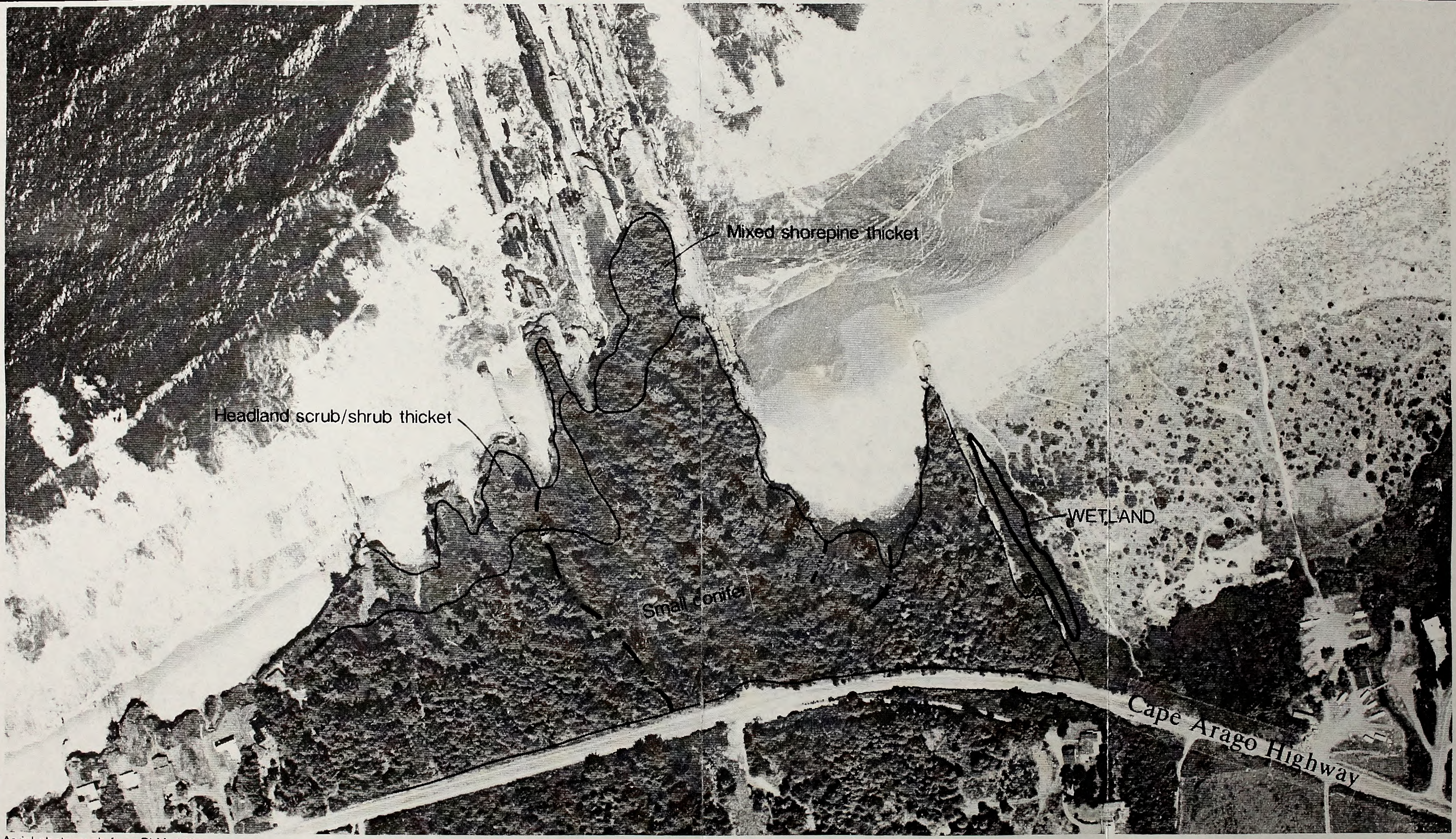
Rare, Threatened, and Endangered Species. Gregory Point contains two areas of potential lily habitat; the small open area near the northern access road, and the open depressional area near the western edge of the site south of the Coast Guard station. Neither site had lilies at a recognizable stage, though commonly associated plants were present. A later survey time would have been necessary to eliminate the possibility of plants at these locations, since a single observed plant at Shore Acres was only at bud stage at the time of the site visit. Later flowering plants may have been present without being readily observed. Further survey time would be needed during the appropriate flowering period to determine if a population of the plant is present in either of these locations.

The dwarf brodiaea *(Brodiaea terrestris)* has been observed on the open grassy terrace on Coast Guard property in the Point's northwest corner (Rittenhouse, pers. comm., 1995). Though not observed during field surveys, appropriate habitat is present and constitutes a likelihood of future observations of the species.

Yoakam Point

The Yoakam Point plant assemblage is similar to that of Gregory Point in being dominated at least in part by a mature Sitka spruce overstory (Figure 11). The stand also includes red alder, Port Orford cedar, and shore pine. The shrub midstory adds structural diversity, with wax-myrtle, salmonberry, and twinberry reaching at least 20 feet high in those areas where trees are well spaced. Evergreen and red huckleberries, cascara, and salal constitute a lower shrub layer.

The overstory varies from widely spaced mature trees to closely spaced poles, reflecting differing logging treatments and ages. Patches of well spaced large trees (mostly Sitka spruce or Port Orford cedar reaching 30 inches or more dbh) most likely developed in response to highgrading, while the tightly spaced younger stands probably developed in response to clearcutting or other more recent disturbance. The wider spacing of trees in the highgraded areas allowed for development of a diverse midstory and understory, while the more closely spaced pole-sized trees have effectively excluded understory species. The Port Orford cedar in the stand appear to be adversely affected by the same agent as is evident on Gregory Point, though more seem to be healthy here than on Gregory Point.



Aerial photograph from BLM, 1992

7941202 October 1995

Wetlands, vegetation types, and wildlife areas for the Yoakam Point site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE

11

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The headland is deeply incised into several isolated ridges that extend seaward, resulting in fingers of dense thicket and forest overstory interspersed with herb-dominated to bare rocky slopes. The thickets are primarily composed of salmonberry, twinberry, salal, and Sitka spruce. The more open areas on each bluff are composed of a diverse mix of native and introduced (i.e., weedy) grasses and forbs, reflecting past disturbance and the instability of the habitat. Common species include spring vernalgrass, orchardgrass, ryegrass, creeping buttercup, coast strawberry, English plantain, yarrow, and clovers.

Yoakam Point contains a sheltered bay near its eastern end, formed by a rocky point that extends out to the surf line from the easternmost ridgeline. The bay contains a gently sloping sandy beach, apparently stable a sufficient period of time to develop a beachgrass/herb community above the high tideline. Among the species encountered are American dunegrass, European beachgrass, beach pea, sea purslane, searocket, and seaside plantain. Shrubs such as twinberry and Hookers' willow are common along the upper beach/ headland interface. The east face of Yoakam Point drops abruptly to willow thickets and a small area of emergent wetland dominated by sedges.

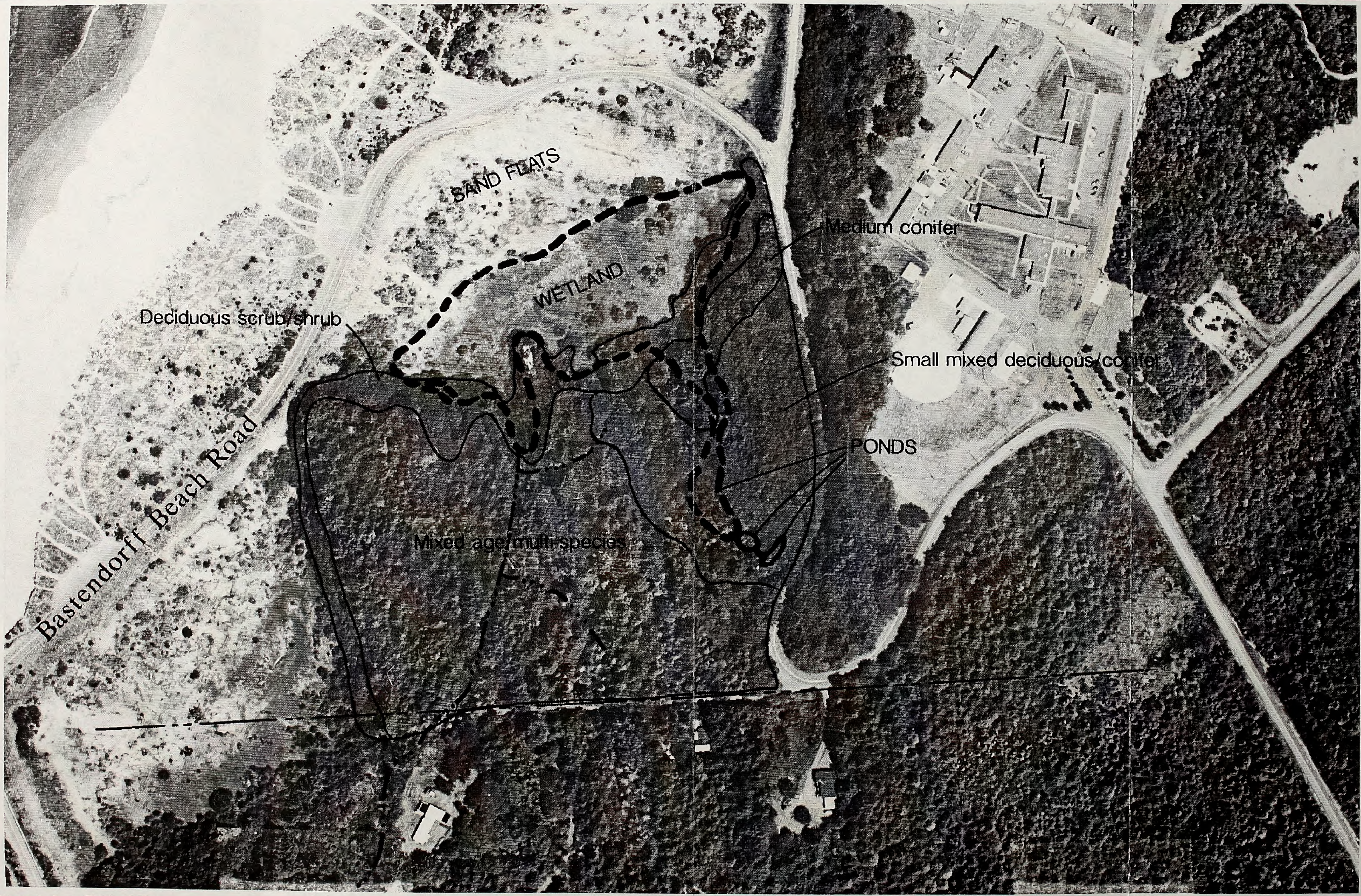
Rare, Threatened, and Endangered Species. Habitat for the western bog lily was considered highly unlikely on this site, though the potential for very small areas of habitat exists along the outer edges of the headland. The combination of boggy ground coupled with a marginal shrub to herbaceous cover was not observed in this area, however. Habitat was also lacking for the other listed species.

Coos Head

Coos Head is the only alternative site that is not directly subjected to wave action, having been isolated from the surfline due to sand dune accretion on Bastendorff Beach in the years following construction of the South Jetty. Instead, the headland is bordered on the north by sandy flats that support both scrub/shrub and emergent wetland communities. The headland proper is fully vegetated by dense mixed conifer and broadleaf forest dominated by Sitka spruce (Figure 12).

Due to past logging impacts the vegetation community consists of the familiar mosaic of young to mature spruce, western hemlock, and Port Orford cedar mixed with red alder. Most trees are less than 24 inches dbh, though occasional individuals reach more than 30 inches dbh, indicating probable highgrade logging over much of the site. Especially dense thickets of salmonberry, salal, wax-myrtle, and alder have formed in more open forest patches generally associated with historic disturbance.

A small drainageway enters the site from near the southwest corner, eventually draining over a waterfall onto the flats north of the headland. The drainage is relatively open next to the southern boundary, where an area has been kept clear of trees adjacent to a residential access road. Salmonberry and slough sedge dominate this section of the drainage, though most of the remainder is sparsely vegetated due to the dense forest overstory. Other areas of flowing or open water are restricted to a string of old log ponds located in the middle eastern portion of the site that ultimately drain toward the



Aerial photograph from BLM, 1992

7941202 October 1995

Wetlands, vegetation types, and wildlife areas for the Coos Head site for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE
12

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northern flats near the site's northeast corner. The log ponds are densely vegetated along the margins by red alder, salmonberry, salal, slough sedge, and false lily of the valley. The dense forest overstory overhanging the ponds is dominated by Sitka spruce and red alder.

The sandy flats north of the headland cliffs are a mosaic of shrub thickets and herb-dominated open areas. Thickets are composed of Scouler's willow, twinberry, salal, and young Sitka spruce and shore pine. Emergent wetland areas are dominated by sedges, rushes, and spikerushes, while drier areas favor beachgrass, yarrow, clovers, thrift, and other herbaceous species.

Rare, Threatened, and Endangered Species. Habitat for the western bog lily was not present on this site. Habitat was not present for any other listed species.

3.1.5.2 Environmental Consequences

Gregory Point

Construction activities of the scale required for the proposed interpretive center would involve the clearing of forest canopy and associated understory plants. Placement of structures and parking facilities will make use, where possible, of the more recently impacted forest and meadow. However, approximately 1 acre of mid-to-late seral stands of Sitka spruce would be affected by the construction. This action would adversely affect both the structural and species diversity of the vegetation communities currently present on the site. Areas necessarily cleared but subsequently landscaped or otherwise restored would be subject to competition from exotic plants favored by disturbance. Trail construction would result in impacts primarily to understory shrubs. Increased foot traffic by visitors would adversely affect understory and groundcover plants through trampling or picking.

Endangered Species. The potential wetland habitat of the western bog lily will not be impacted by construction. A major threat to lily populations has involved picking the flowers or collecting the plant for private garden use. Trampling from pedestrians may also impact individuals or populations of the plant. These threats may be greatly increased by improved access from the development itself and associated trails.

Threats to the dwarf brodiaea would ensue from clearing and construction activities that impact or remove grassland habitat in the northwest corner of the site. Increased foot traffic in this area may also impact the population through trampling and picking.

Yoakam Point

Similar impacts to vegetation communities can be expected from construction activities at Yoakam Point. The existing structural integrity of a relatively mature, multicanopied forest would be disrupted by clearing for building placement and associated parking space. Approximately 5.4 acres of small conifer forest would be directly impacted by these activities. Trail construction can be expected to produce relatively lower impacts to the vegetation community, primarily to understory species. However, the enhanced access by visitors would increase pressure on many species due to trampling and picking, resulting in some losses to species and structural diversity. Disturbance would also favor increases in weedy, opportunistic species that may outcompete native species, causing shifts to community composition.

Endangered Species. No significant impacts to any of the listed species of concern are anticipated on this site.

Coos Head

The mature spruce overstory dominating Coos Head would be impacted by the construction. The integrity of the stand for wildlife use and overall species diversity would be diminished given the restricted size of the site and proportionately large scale of the proposed activities. Approximately 4 acres of mature second-growth overstory would be directly impacted by site preparations for the building footprints and parking. Trail construction would result in lower impacts, primarily to understory shrubs and groundcover. However, increased pedestrian access to wooded areas would potentially result in further impacts to vegetation through trampling and picking. Disturbance would also favor weedy non-native species that may outcompete natives for space and other resources.

Endangered Species. No significant impacts to any of the listed species of concern are anticipated on this site.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.5.3 Mitigation Measures

Onsite mitigation measures for vegetation impacts on Gregory Point, Yoakam Point, and Coos Head are similar and include the following practices:

- Avoid vegetation impacts whenever possible;
- Incorporate existing native species into design plans;
- Revegetate impacted areas with native species;
- Construction machinery and activities should be restricted to the smallest areas necessary for job completion, in order to minimize impacts to vegetation;

- Existing vegetation should be retained wherever possible and enhanced with additional plantings if the understory is disturbed. Landscaping with native plants can replace some of those removed during construction, and conservation plantings (transplants from impacted areas) should be used wherever feasible;

- Control nuisance non-native species to minimize competition with pre-existing or newly planted natives;

- Control access into natural areas through well-defined trails, handrails, signage, or other means to minimize disturbance from trampling or picking; and

- Educate visitors as to the value of preserving native plants and communities through guided walks, signage, or other means.

Mitigation measures recommended for impacts to potential populations of western bog lily include:

- Provide a buffer around any surveyed populations of the lily (if found) that maintains appropriate vegetative and hydrologic conditions for the plants' continued survival;

- Minimize pedestrian access to plants by routing trails away from individuals or populations. Where plants are relatively unavoidable, place barriers to access and educate visitors as to the plants' sensitivity and importance to biodiversity; and

- Institute a regular and ongoing monitoring program to assess changes in the populations' status and provide management guidelines for dealing with undesirable changes.

Mitigation measures for impacts to the dwarf brodiaea are not mandated by its current status. However, avoidance of known populations is warranted whenever possible. If impacts are unavoidable, conservation transplanting to more appropriate sites should be attempted to maintain local populations.

3.1.6 WILDLIFE

Information related to habitat and wildlife species relative the site was gathered through communications with personnel from Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife (USFWS), BLM, Oregon State University (OSU), Oregon Institute of Marine Biology (OIMB), and Oregon Parks and Recreation Department (OPRD). A list of rare, threatened, and endangered (RTE) species that have been observed in the vicinity of the sites was obtained from the Oregon Natural Heritage Program (ONHP) and a list of RTE species that could potentially occur in the area was obtained from the USFWS. Additionally, color aerial photos (BLM, 1992), and preliminary site plans were reviewed.

Field visits were conducted on May 24-25 and June 13- 14 1995. A systematic traverse of each site was performed. Wildlife sightings, tracks, scat, and habitat features (*e.g.* vegetation, snags, stumps, and coarse woody debris) were noted at each site. (Note: to limit disturbance to seabirds surveyors did not visit Chief's or Squaw Island). No quantitative or species specific surveys were performed. No known surveys of the terrestrial habitats have been conducted by state or federal agencies, or private individuals or groups.

3.1.6.1 Affected Environment

Regional

The three alternative sites are located south of the Coos Bay Inlet within the Sitka spruce zone (Franklin and Dyrness, 1973). The area is characterized by mild winters and summers. The vegetation communities in the area have been repeatedly altered by human activity, including timber harvest, land clearing, fire, and development. The geological composition and orientation combined with the tidal erosion have resulted in rocky headlands, cliffs, platform, submerged, and exposed rocks with interspersed sandy beaches (Oregon Ocean Policy Advisory Council, 1994). The resulting mix of substrates, vegetation communities, and weather conditions (including effects of the ocean) have resulted in diverse intertidal communities, marine bird and mammal populations, and upland wildlife communities.

Gregory Point

Habitat. Gregory Point (approximately 31 acres) is the southern most alternative site. ODFW recently designated the area between Squaw Island and Chief's Island as an Intertidal Research Area (ODFW, 1995). In some areas, erosion has left rocky outcrops at the water level. These intertidal areas are most prominent at on the Sunset Bay side of the point and the rock/sand spit the connects Squaw Island to the point. The site is predominantly flat, though gently sloping toward the center and to the southeast.

The Cape Arago Highway separates the point from upland areas to the east and represents a movement barrier to terrestrial wildlife. Trails along the southern edge out to the western tip of the point and down to the spit that connects the point to Squaw Island indicate that people from Sunset Bay State Park sometimes enter the area.

Several habitat types area present on Gregory Point (Figure 10). The southern and eastern half of the point is dominated by a mature to old-growth stand of Sitka spruce with occasional Port Orford cedar, primarily located in the southeast corner. Western hemlock are scattered through the area, and red alder was found near the highway and the drainage. The Sitka spruce average dbh appears to be between 28-34 inches although trees 36-45 inches were relatively common and several trees were measured at 50-52 inches dbh. Spruce represents approximately 90% of the overstory. The cedar, typically smaller in diameter (average 20-24 inches dbh with some 30 inches or greater), western hemlock (16-20 inches dbh), and red alder (6-10 inches dbh, occasionally 20 inches or greater) comprised the remainder. There is a dense understory of cascara, salal, salmonberry, and occasional evergreen huckleberry and red huckleberry. The ground layer consisted of several fern species including sword fern, bracken fern, and deer fern, and false lily of the valley (See Table 5 in Section 3.1.5 for complete plant list).

Canopy cover within the stand varied from approximately 30% to greater than 70%. Coarse woody debris appeared to be moderately abundant and typically large (20-40 inches in diameter and 20 feet or greater in length), although most is old and substantially decayed (Class IV-V). Several large (30 or more inches dbh) broken-top spruce snags were observed, and red alder snags were found near the stream channel.

The stand transitions at the westward edge of the point into small conifer (15-20 inches average dbh, occasionally to 25 inches) dominated by Sitka spruce before becoming a more open stand of 8-10 inch diameter shore pine at the western tip. Occasional cedar and western hemlock in the same size class are also present. A few larger (20-26 inch dbh) Sitka spruce are present. The understory is dominated by dense salal. The shore pine extends from the western tip around the northeast and northern margins of Gregory Point. Coarse woody debris is moderately abundant - primarily windthrown spruce and shore pine. No snags were observed. Canopy cover is highly variable ranging from 10-60% but usually in the lower range.

The northern part of the point is dominated by 14-16 inch average dbh Sitka spruce (range 12 to 26 inches). Patches of cedar (18 inches dbh average) are scattered through out the site, and western hemlock (average dbh 14-16 inches) are regularly interspersed with the spruce. The understory is patchy ranging from open areas with only herbaceous cover (false lily of the valley) to dense thickets of salal or rhododendron. Twinberry is also present at the margins of openings particularly near the roads.

The western half of the stand is dense grown Sitka spruce and western hemlock. Canopy cover is approximately 80% with shade mortality beginning to take place and abundant, but small ($\leq$ 10 inches in diameter), coarse woody debris. Shade mortality has resulted in small subcanopy snags, typically 10 inches dbh or less.

The area around the U.S. Coast Guard housing facility and the northern point have been maintained as open grass lawn.

The eastern half of the Gregory Point site is more open and shows signs of past timber harvest. Trees in this area are typically at the larger end of the average diameter range than those in the western half. The tree density is irregular with several openings. Canopy cover ranges from 10% to 80%. Coarse woody debris is moderately abundant, average size is 20-24 inches and generally well decayed.

The intertidal areas are characterized by rocky outcrops and platforms. Squaw and Chief's Islands, both created from erosion, rise approximately 80 feet above the water surface. Squaw Island has a small stand of trees (shore pine and Sitka spruce) with some grasses and shrubs (primarily salal). Chief's Island is lacking overstory although some shrubs and grasses do exist.

Special Features. A small intermittent drainage runs in south-southwest direction through the southeastern corner of the site. A small amount of flowing water was present in the drainage (some flows subsurface) during the site visit. Flow from upslope is conveyed under the Cape Arago Highway through a concrete culvert. A second smaller drainage flows into the first from the northwest. The main drainage flows through a steep-sided gully (35-45 degrees). The channel bottom is 1-2 feet wide and surface water is 1-3 inches deep. In some areas the channel bottom widens and ponding occurs. Riparian vegetation is dominated by red alder, salmonberry, and salal. An abandoned road or skid trail follows the main drainage.

Habitat Summary. Gregory Point provides moderate- to high-quality habitat for a variety of wildlife species. The areas of very tall canopy cover provide thermal cover for wildlife. Vertical structural diversity is high particularly in the southern and northeastern areas. Structural complexity is directly related to food value for wildlife because different species forage at different levels of the canopy. It also provides increased potential roosting and/or nesting habitat. A variety of understory vegetation provides several forage sources for wildlife. The interior of the stand is effectively shielded by vegetation along the edges of the unit, reducing the effects of weather, providing hiding cover from predators, and screening human activity.

The mature or late successional stand provides additional habitat benefits. The large limbs provide increased nesting and resting areas. The large boles provide habitat for primary cavity users (woodpeckers), which in turn provides habitat for secondary cavity users such as squirrels and various bird species. The large diameter snags and provide habitat for various small mammals and amphibians such as voles, bats, and salamanders.

The large-diameter, coarse woody debris is low to moderately abundant throughout the site. Coarse woody debris provides denning areas and protected travelways for small mammals and amphibians such as voles, squirrels, weasels, and salamanders. Limited coarse woody debris can potentially reduce the number of small mammals likely to be in the area and decrease the number of species that prey upon them.

Birds. Although only a limited number of bird species were observed during the site visit, the habitat features (structural and plant species diversity) make it likely that the area is regularly used by a variety of species. Species groups that are known or likely to use all or part of the Gregory Point for some part of their life requirements include migratory and resident songbirds, corvids (crows and jays), woodpeckers, raptors, and seabirds. Table 6 presents a partial list of avian species known or likely to occur at the site.

Table 6. Partial List of Avian Species

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
American crow	*Corvus brachyrhynchos*	X[1]	X[1]	X[1]
American goldfinch	*Carduelis tristis*	X	X[1]	X[1]
American kestrel	*Falco sparverius*	X	X	X
American robin	*Turdus migratorius*	X[1]	X[1]	X[1]
Bald eagle	*Haliaeetus leucocephalus*	X	X	X[1]
Band-tailed pigeor	*Columba fasciata*	X	X	X
Barn Swallow	*Hirundo rustica*	X[1]	X	X[1]
Black-crowned night heron	*Nycticorax nycticorax*	--	--	X[1]
Black-capped chickadee	*Parus atricapillus*	X[1]	X[1]	X[1]
Black-headed grosbeak	*Pheucticus melanocephalus*	X	X	X
Black oystercatcher	*Haematopus bachmani*	X[2]	X	--
Black-throated gray warbler	*Dendroica nigrescens*	X	X	X
Blue grouse	*Dendragapus obscurus*	X	X	X
Brandt's cormorant	*Phalacrocorax penicillatus*	X[1,2]	X[1,2]	--
Brown creeper	*Certhia americana*	X	X	X
Brown pelican	*Pelecanus occidentalis*	X[2]	X[2]	--
Chestnut-backed chickadee	*Parus rufescens*	X	X	X[1]
Common murre	*Uria aalge*	X[1,2]	X[1,2]	--
Common yellowthroat	*Geothlypis trichas*	X	X	X
Cooper's hawk	*Accipiter cooperii*	X	X	X[1]
Dark-eyed junco	*Junco hyemalis*	X	X	X
Double-crested cormorant	*Phalacrocorax auritus*	X[1,2]	X[1,2]	--
Downy woodpecker	*Picoides pubescens*	X	X	X
Evening grosbeak	*Coccothraustes vespertinus*	X	X	X
Flycatcher species	*Empidonax* sp.	X	X	X
Golden-crowned kinglet	*Regulus satrapa*	X	X	X
Gray jay	*Perisoreus canadensis*	X	X	X
Gull species	*Larus* sp.	X[1,2]	X[1,2]	X[1,2]
Hairy woodpecker	*Picoides villosus*	X	X	X
Hermit thrush	*Catharus guttatus*	X	X	X
Hutton's vireo	*Vireo huttoni*	X	X	X
Killdeer	*Charadrius vociferus*	--	--	X[1]
MacGillivary's warbler	*Oporornis tolmiei*	X	X	X
Mallard	*Anas platyrhynchos*	--	--	X[1]
Marbled murrelet	*Brachyramphus marmoratus*	X	X	X
Nashville warbler	*Vermivora ruficapilla*	X	X	X
Olive-sided flycatcher	*Contopus borealis*	X	X	X
Osprey	*Pandion haliaetus*	X[1]	X	X
Orange-crowned warbler	*Vermivora celata*	X	X	X
Pelagic cormorant	*Phalacrocorax pelagicus*	C		
Peregrine falcon	*Falco peregrinus*	X[2]	X	X
Pigeon guillemot	*Cepphus columba*	X[1,2]	X[1,2]	--

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
Pileated woodpecker	*Dryocopus pileatus*	X^1	X	X
Pine siskin	*Carduelis pinus*	X	X	X
Purple finch	*Carpodacus purpureus*	X	X	X
Red-breasted nuthatch	*Sitta canadensis*	X	X	X
Red-breasted sapsucker	*Sphyrapicus ruber*	X	X	X
Red crossbill	*Loxia curvirostra*	X	X	X
Red-tailed hawk	*Buteo jamaicensis*	X	X	X
Rhinoceros auklet	*Cerorhinca monocerata*	X^2	X	--
Ruby-crowned kinglet	*Regulus calendula*	X	X	X
Rufous-sided towhee	*Pipilo erythrophthalmus*	X	X	X
Sharp-shinned hawk	*Accipiter striatus*	X	X	X
Snowy plover	*Charadrius alexandrinus*	X	X	X
Song sparrow	*Melospiza melodia*	X^1	X	X^1
Stellar's jay	*Cyanocitta stelleri*	X^1	X^1	X^1
Swainson's thrush	*Catharus ustulatus*	X^1	X	X
Townsend's solitaire	*Myadestes townsendi*	X	X	X
Tree swallow	*Tachycineta bicolor*	X	X	X^1
Tufted puffin	*Fratercula cirrhata*	X^2	X	--
Turkey vulture	*Cathartes aura*	X	X	X^1
Varied thrush	*Ixoreus naevius*	X	X	X
Warbling vireo	*Vireo gilvus*	X	X	X
Western tanager	*Piranga ludoviciana*	X	X	X
Western wood-pewee	*Contopus sordidulus*	X	X	X
White-breasted nuthatch	*Sitta carolinensis*	X	X	X
Wilson's warbler	*Wilsonia pusilla*	X	X	X
Winter wren	*Troglodytes troglodytes*	X^1	X^1	X^1
Wrentit	*Chamaea fasciata*	X	X	X
Yellow-rumped warbler	*Dendroica coronata*	X	X	X

X: habitat present, not observed or reported
X^1: species observed during SRI/SHAPIRO site visit
X^2: species reported by USFWS (1995), ONHP (1995), R.Lowe (1995), J. Hodder (1995)
--: habitat not present

Gregory Point and the off shore rocks are heavily used by seabirds for roosting and nesting. USFWS surveys in 1988 counted 1,265 nesting seabirds, including 294 pelagic cormorants, 396 (a 1992 species-specific survey found 634) Brandt's cormorant, 112 (1992) double-crested cormorants, 156 pigeon guillemots, 2 black oyster catchers, 292 western gulls, and 13 tufted puffins on the rocky cliffs and islands. Common murres and rhinoceros auklets were also noted but not observed to be nesting. Additionally, the endangered brown pelican is known to roost on the off-shore rocks. From 1988 to 1993 the USFWS counted between 21 (1992) and 260 (1988) roosting pelicans during single day surveys at the site (R. Lowe, pers. comm., 1995; ONHP, 1995).

Mammals. Evidence of three terrestrial mammal species were observed during the site visit: black-tailed deer, Douglas squirrel, and coyote. The structural diversity of the stand and proximity to large, relatively undisturbed, forest areas to the southeast make it likely that a greater diversity of mammals use the site. Table 7 contains a partial list of mammals known or likely to occur at the site.

Table 7. Partial List of Mammals

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
Beaver	*Castor canadensis*	--	--	X^1
Black-tailed deer	*Odocoileus hemionus*	X^1	X^1	X^1
Brush rabbit	*Sylvilagus bachmani*	X	X	X
Coyote	*Canis latrans*	X	X^1	X^1
Deer mouse	*Peromyscus maniculatus*	X	X	X
Douglas squirrel	*Tamiasciurus douglasii*	X^1	X^1	X
Fringed myotis	*Myotis thysanodes*	X^2	X^2	X^2
Harbor seal	*Phoca vitulina*	X	X	--
Little brown myotis	*Myotis lucifugus*	X	X	X
Long-eared myotis	*Myotis evotis*	X^2	X^2	X^2
Long-legged myotis	*Myotis volans*	X^2	X^2	X^2
Long-tailed weasel	*Mustela frenata*	X	X	X
Pacific western big-eared bat	*Plecotus townsendii townsendii*	X^2	X^2	X^2
Raccoon	*Procyon lotor*	X	X	X
Red-tree vole	*Phenacomys longicaudus*	X	X	X
Roosevelt elk	*Cervus elaphus*	X	X^1	X
Short-tailed weasel	*Mustela erminea*	X	X	X
Shrew species	*Sorex* sp.	X	X	X
Stellar's sea lion	*Eumetopias jubatus*	X^2	X^2	--
Striped skunk	*Mephitis mephitis*	X	X	X
Vole	*Microtus* sp.	X	X	X
White-footed vole	*Arborimus albipes*	X^2	X^2	X^2
Woodrat species	*Neotoma* sp.	X	X	X
Yuma myotis	*Myotis yumanensis*	X^2	X^2	X^2

X: habitat present, not observed or reported
X^1: species observed during SRI/SHAPIRO site visit
X^2: species reported by USFWS (1995), ONHP (1995), R.Lowe (1995), J. Hodder (1995)
--: habitat not present

Reptiles and Amphibians. No reptiles or amphibians were observed during the site visit. The presence of the intermittent stream in the southeast corner, and general habitat characteristics (coarse woody debris, surface litter) make it likely that the area could be used by a variety of species, primarily amphibians. Table 8 provides a partial list of amphibian and reptile species that may occur at the site.

Table 8. Partial List of Amphibians and Reptiles

Common Name	Scientific Name	Gregory Point	Yoakam Point	Coos Head
Clouded salamander	*Aneides ferreus*	X	X	X
Dunn's salamander	*Plethodon dunni*	--	--	X
Ensatina	*Ensatina eschscholtzii*	X	X	X
Northwestern salamander	*Ambystoma gracile*	--	--	X
Pacific tree frog	*Pseudocris regilla*	X	X	X
Red-legged frog	*Rana aurora*	X^2	X^2	X^2
Rough-skinned newt	*Taricha granulosa*	X	X	X
Western red-backed salamander	*Plethodon vehiculum*	X	X	X

X: habitat present, not observed or reported
X^1: species observed during SRI/SHAPIRO site visit
X^2: species reported by USFWS (1995), ONHP (1995), R.Lowe (1995), J. Hodder (1995)
--: habitat not present

Rare, Threatened, and Endangered Species. The USFWS, ODFW, and ONHP were contacted regarding observations of RTE species on the site. Seven mammals, six birds, and five amphibian species were reported as known to occur or potentially present in the vicinity of the site. Of those species, suitable habitat is present for all the mammals and bird species, and one of the amphibian species (Table 9). The site is within the range of the marbled murrelet (USDA et al., 1994) and the site review found that potential habitat for the marbled murrelet is also present. Murrelets were not included in the USFWS list.

Species on the USFWS RTE list that are unlikely to be present at or in the vicinity of the Gregory Point include the tailed frog, northwestern pond turtle, foothills yellow-legged frog, and southern torrent (seep) salamander. The tailed-frog, foothills yellow-legged frog and southern torrent salamander all require cold, clear, permanent streams, or seeps. The intermittent stream in the southeast corner of the site does not provide this type of habitat. Northwestern pond turtles require deep ponds or slow moving creeks, with logs and rocks for basking. No suitable habitat is available at the site.

Stellar's sea lion are known to use the Simpson's Reef area as a haul-out approximately 3 miles to the south of the site. Several of the off shore rocks may provide suitable haul-out areas for the sea lion and it is possible that sea lions would be seen in area. Pinnepeds could be heard to the south and harbor seals were observed swimming off Squaw Island. No records of Stellar's sea lions using Gregory Point or being observed near the point were reported. No sea lions were observed during the field visit.

Table 9. Federally listed and proposed endangered and threatened species and candidate species that may occur in the area of the proposed Bal'diyaka Center

COMMON NAME	SCIENTIFIC NAME	CATEGORY*
LISTED SPECIES		
Mammals		
Stellar sea lion	*Eumetopias jubatus*	LE
Birds		
Aleutian Canada goose	*Branta canadensis leucopareia*	LT
Bald eagle	*Haliaeetus leucocephalus*	LT
Documented nest in T26S R14W Sec. 14		
Brown pelican	*Pelecanus occidentalis*	LE
Documented roost in T26S R14W Sec. 4		
Marbled murrelet**	*Brachyrhamphus marmarotus*	LT
Peregrine falcon	*Falco peregrinus*	LT
Western snowy plover	*Charadrius alexandrinus*	LT
Plants		
Western lily	*Lilium occidentale*	LE
Documented in T26S R14W Sec. 4		
PROPOSED SPECIES		
None		
CANDIDATE SPECIES		
Mammals		
Fringed myotis (bat)	*Myotis thysanodes*	C2
Long–eared myotis (bat)	*Myotis evotis*	C2
Long–legged myotis (bat)	*Myotis volans*	C2
Pacific western big–eared bat	*Plecotus townsendii townsendii*	C2
White–footed vole	*Arborimus albipes*	C2
Yuma myotis (bat)	*Myotis yumanensis*	C2
Birds		
Little willow flycatcher	*Empidonax traillii brewsteri*	C2
Amphibians and Reptiles		
Foothills yellow–legged frog	*Rana boylii*	C2
Northern red–legged frog	*Rana aurora aurora*	C2
Northwestern pond turtle	*Clemmys marmorata marmorata*	C2
Southern torrent (seep) salamander	*Rhyacotriton variegatus*	C2
Tailed frog	*Ascaphus truei*	C2
Fish		
Green sturgeon	*Acipenser medirostris*	C2
Pacific lamprey	*Lampetra tridentata*	C2
River lamprey	*Lampetra ayresi*	C2
Invertebrates		
Newcomb's littorine snail	*Algamorda newcombiana*	C2
Plants		
Moss	*Limbella fryei*	C2
North Coast bird's beak	*Cordylanthus maritimus spp. palustris*	C2
Documented in T26S R14W Sec. 2, 11, 14		
Pink sand verbena	*Abronia umbellata spp. breviflora*	C2
Historic collection in T26S R14W Sec. 3		
Silvery phacelia	*Phacelia argentea*	C2

***KEY TO CATEGORIES:**
LE – Listed Endangered
LT – Listed Threatened
C2 – Category 2 Candidate

**Not on USFWS List but potential habitat present

Aleutian Canada geese use off-shore islands during winter migrations for roosting and forage in open fields near the ocean. The rocks off Gregory Point may provide suitable roosting habitat and Chief's Island provides limited foraging opportunity. No records of Aleutians in the area were reported and none were observed during the field visit.

Western snowy plovers forage and nest on beaches and unstabilized sand dunes. Lighthouse beach provides potential habitat for plovers; however, it appears that near the site the tide regularly comes to the cliff edges, which would limit plover nesting in the vicinity of the site. No records of snowy plovers for the area were reported and none were observed during the field visit.

Brown pelican have been observed roosting on the rocks off Gregory Point (Lowe, pers. comm., 1995; ONHP, 1983). No brown pelicans were observed during the field visit.

Peregrine falcons have been observed roosting on Chief's Island (J. Hodder, pers. comm., 1995). It is not known if peregrine falcons are or have attempted to nest at the site. The rocky islands and cliffs provide potential, but generally limited, nesting habitat. No peregrine falcons were seen during the field visit.

There is a documented bald eagle nest approximately 3 miles to the southeast of the site. Bald eagles may use the large trees as perches and forage in the area. Several of the trees within the stand provide potential nest or roost sites; however, the regular human activity associated with Sunset Bay limits the probability of eagles using the area. No records of bald eagles were reported for the site and no eagles were seen during the field visit

The site falls within the range (Zone 1) of the marbled murrelet, which extends from the coast 35 miles inland in Oregon (USDA et al., 1994). Marbled murrelets nest in old-growth stands or younger stands that maintain old-growth characteristics. Murrelet nests are most commonly located on large moss covered limbs. The average nest stand size in Oregon is 198 acres, although nests have been found in stands as small as 7 acres (Hamer and Nelson, 1995). Nests in Oregon have been found from 1 mile to 25 miles from salt water (Hamer and Nelson, 1995). Areas less than 1 mile from salt water may be avoided because of the greater number of predators (gulls and corvids) found in the area (Hamer and Nelson, 1995). The forest in immediate proximity to the coast has been heavily altered and fragmented by human activity, leaving little suitable habitat (USDA et al., 1994; Hamer and Nelson, 1995). The stand's location on the exposed headland and relatively small size may limit the likelihood of murrelet presence. However, structural characteristics of a stand are believed to be the best indicator of potential murrelet use (Hamer, 1995; Grenier and Nelson, 1995) and murrelets have been found on coastal headlands in Alaska and British Columbia (Nelson pers. comm., 1995). The southern stand of large Sitka spruce provides potential nesting habitat for murrelets and murrelets may be present. No records of murrelets at the site or in the area were reported and none were observed during the field visit. A draft Recovery Plan for the marbled murrelet has been prepared (USFWS, 1995a). The site falls within the Siskiyou Coast Range Recovery Zone (Zone 4). The USFWS also published a Proposed Designation of Critical Habitat for the Marbled Murrelet on August 10, 1995. The site is not mapped as Critical Habitat under the proposed designation (USFWS, 1995b).

The little willow flycatcher is typically found in willow or alder thickets along streams or wetlands. They forage on flying insects. The area around the small drainage in the south corner of the site may provide some habitat. The upland areas to east also may provide habitat and flycatchers if present may move between areas to forage. No records of little willow flycatcher were reported and none were observed during the field visit.

The white-footed vole is considered the rarest microtine rodent in North America (Maser and Johnson, 1967) and as such very little is known about its life history. Their known range extends west from the crest of the Cascades of Oregon and Northern California to the coast, under 3,500 feet elevation. The majority of specimens have been found along the coast, where they are found almost exclusively in riparian alder/small stream habitat. Old growth or mature forest also appear to be a requirement. Anthony et al. (1987) only captured white-footed voles in areas where old growth or mature conifers were present. They are usually found within 115 feet of a stream; however, in logged or burned areas they may be found several hundred yards from the streamside (Maser and Hooven, 1969). The small stream in the southern corner of the site would provide appropriate habitat for white-footed vole. There are no recorded observations of white-footed voles at the site, and none were observed during the field visit.

Four species of myotis (bat) could potentially occur at the site, long-eared myotis, fringed myotis, long-legged myotis, and Yuma myotis. These bat species require caves, mines, buildings, bridges, or, large cracks and crevices in bark such as those found in large snags or old trees for winter hibernation, maternity, and summer day and night roosts (USDA et al., 1993; Christy and West, 1993). They predominantly forage over water sources such as lakes, rivers, and wetlands (Christy and West, 1993). Bats would also forage over open fields or in forest stands with an open understory.

The larger Sitka spruce and the large snags found on the site would provide suitable day and night roosts for these bat species. The open grass area at the USCG housing and the small open area to the west of the housing as well as the more open areas of the stand are potential foraging areas. There are no recorded observations of any of these bat species at the site. No bats were observed during the field visit. Field visits took place during daylight hours.

Western (Townsend's) big-eared bat requires caves, mines, or possibly deep boulder fields for winter hibernation and reproduction. They have also been found in buildings. Requirements for summer and day roosts are unknown but it is suspected that large snags or live trees with fissures in the bark may be used. Feeding usually occurs in coniferous forest and wetlands (Ingles, 1965; Burt and Grossenheider, 1976). No suitable winter roosts were observed on the site. The adjacent private residences and Oregon Pards and Recreation Department buildings may provide winter roost areas. The large spruce at the site do provide potential summer and day roosts. Big-eared bats may also forage in the stand. There are no recorded observations of western big-eared bats at the site and none were observed during the field visit.

The red-legged frog is the only amphibian on the USFWS list for which potential habitat is present. Red-legged frogs require quiet water with surrounding vegetation and inhabit moist forest and valley riparian habitat. Breeding habitat and egg-laying habitat includes temporary (dries up by June to July) or permanent marshes, and slower moving streams. Eggs must remain in water until tadpoles metamorphose into terrestrial frogs. The species is most common in wooded areas in the lowlands and foothills, but also occurs in grasslands (Leonard et al., 1993). During the non-breeding season (May-January) the species may occur up to 1,000 feet from water in moist woods (Stebbins, 1966). The stream in the south corner of the site provides potential breeding habitat and the upland areas may be used by red-legged frogs during the non-breeding season. Frogs that breed off-site in area to the east may also move onto the site during the non-breeding season; however, the Cape Arago highway poses a significant barrier to movement. There are no recorded observations of red-legged frogs at the site and none were observed during the field visit.

Yoakam Point

Habitat. Yoakam Point (approximately 22 acres in size) is similar to Gregory Point, a rocky headland oriented to the northwest with fingers of basalt extending out into the ocean. The headland is approximately 80 feet above the surface of the water. Yoakam Point has several rock "fingers" with narrow surge channels where wave action has eroded away the softer materials and in some places created caves. Wave action has also created a larger cove in the eastern part of the site. Lighthouse Beach is located to the immediate southwest and Bastendorff Beach to the northeast. The Cape Arago Highway is the southern border and private residences are the dominant built feature in the upland areas to the south-southwest. The terrain is gently rolling through most of the site. A trail runs from the southwest corner out the northern tip.

There are two general habitat types at Yoakam Point (Figure 11). The greater part of the site is small conifer (17 inch average dbh, occasionally to 28 inches). Sitka spruce is the dominant overstory tree with occasional western hemlock and cedar (a few cedar are or exceed 30 inches dbh). Some shore pine is also intermixed but primarily found near the highway. The shrub layer consists of salal, salmonberry, and evergreen and red huckleberry.

Canopy cover within the stand varied from approximately 50% to greater than 70%. Coarse woody debris abundance appeared to be generally low, and small to moderately sized; however, most decay classes were represented. Snags appeared to be scarce.

The stand transitions as it approaches the ocean into a more open stand of 8-10 inch diameter spruce, shore pine, and occasional cedar. Salal is the dominant understory plant. The stand is broken up by dense stands of small (2-6 inch) spruce. Along the seaward edge, on the southwest corner, there are dense scrub/shrub thickets dominated by salal and salmonberry.

Canopy cover is highly variable from 30% to 100% in the thicket areas. Coarse woody debris appeared to be moderately abundant, small to medium sized, and most decay classes were represented although a few larger class IV and V logs (well decayed) were observed.

Special Features. A small cave was found at the beach level on the eastern side of the main point. The cave is 15-20 feet deep with a ceiling height of 12-15 feet. The entrance is approximately 3-feet wide and 8-feet tall.

A small intermittent stream flows west along the south edge of the site before turning to the north. It was actively conveying water at the time of the site visit, although in some places most flows were underground. The bottom of the stream channel is 1-2-feet wide. The channel is 8-16 inches deep. The surface water depth was 1-2 inches. Red alder, spruce, salal, and salmonberry are the dominate riparian vegetation.

The forest area immediately south of the site across the Cape Arago Highway is managed by the Nature Conservancy and contains a wetland complex (Bastendorff Bog Preserve).

Habitat Summary. Yoakam Point provides moderate quality habitat for wildlife. Habitat diversity is generally lower than that found at Gregory Point. Structural diversity, though lacking large trees and snags, is generally good throughout the site and understory vegetation is dense in areas but is limited in diversity. The lack of diversity decreases foraging opportunities and nesting areas. The low number of snags present may limit the number of cavity-users found on site. Vegetational density, canopy cover, and stand width is sufficient to provide thermal regulation and effectively buffer the stand from most weather extremes and human disturbance.

Birds. Several bird species were observed during the site visit including American goldfinch, song sparrow, Swainson's thrush, common yellowthroat, barn and cliff swallow, common murre, pigeon guillemot, pelagic and double-crested cormorant, and western gull. The vegetative structure on the site makes it likely that the site is used by a greater number of species than observed for all or part of their life requirements. For a partial list of bird species known or likely to occur it the area see Table 6.

No nesting seabirds were observed during the most current USFWS (1988) survey. Seabirds do regularly use the site, however, and some nesting may be occurring that has not been observed. During the 1990 survey, four brown pelicans were observed roosting on the rocks immediately off-shore (R. Lowe, pers. comm., 1995).

Mammals. Elk tracks, Douglas squirrel, and black-tailed deer were observed on the site during the field visit. The presence of the large, relatively undisturbed, forest to the south and the structural components of the stand make it likely that a greater diversity of mammal species regularly use the site. The site is not large enough to provide for the life requirements of the larger mammals, but it is likely that they regularly use the site. Table 7 contains a partial list of mammals known or likely to occur at the site.

Reptiles and Amphibians. No reptiles or amphibians were observed during the field visit. The presence of the intermittent stream on the western side of the site makes it likely that some species of amphibians occur at the site. Table 8 provides a partial list of reptile and amphibian species that may occur at the site.

Rare, Threatened or Endangered Species. The same RTE species listed as potentially being present at Gregory Point are potentially present at Yoakam Point. The field survey indicates that suitable habitat is present for six of the mammal species, all the bird species, and one of the amphibian species (Table 9).

Species on the USFWS list that are unlikely to be present at or in the vicinity of the Yoakam Point include the tailed frog, northwestern pond turtle, foothills yellow-legged frog, and southern torrent (seep) salamander.

The nearshore rocks are generally sharp edged with steep sides, making it unlikely that this area would be used by Stellar's sea lion as a haul-out site. The Simpson's reef area approximately 4 miles to the south is used; however, and sea lions may be seen off Yoakam Point. ONHP and the USFWS had no recorded observations of Stellar's sea lion at the site and none were observed during the field visit.

The Aleutian Canada goose may roost on the off-shore rocks during migrations. However, no records of observations were reported for the site or the general area and none were observed during the field visit.

The western snowy plover has been observed on Bastendorff Beach in the past (J. Collins, pers. comm., 1983 in OPRD, 1986). The plovers were not believed to be nesting. No other records of plovers were reported and none were observed during the field visit. Bastendorff Beach is subject to regular human activity, which may discourage plovers from nesting there although suitable habitat is present and plovers may occasionally forage there.

No recorded observations of peregrine falcons were reported and none were observed during the field visit. Peregrine falcons may forage over the site or occasionally roost on the rock cliffs.

There is a documented bald eagle nest approximately 3 miles to the southeast of the site. Bald eagles may use the scattered large trees as perches and forage in the area. The site would not provide suitable nesting habitat for bald eagles. The largest trees on site are smaller than the average nest tree diameter. No records of observations of bald eagles at the site were reported and none were observed during the field visit.

Brown pelicans have been recorded roosting on the rocky extensions from the point and off shore rocks (Lowe, pers. comm., 1995). No brown pelicans were observed during the field visit.

No records of marbled murrelet occurrences were reported and none were observed during the field visit. However, the site falls within the range of the murrelet. Murrelets are known to nest in second growth forests with remnant old growth trees or old growth type structure such as large moss covered limbs (Grenier and Nelson, 1995). The small stand size and overall small tree size may limit the likelihood of murrelet use; however, several of the trees on the site had limbs and structure characteristics that could provide a nest platform for murrelets and murrelets have been found nesting in stands as small as 7 acres (Hamer and Nelson, 1995).

The intermittent stream provides potential habitat for white-footed vole and red-legged frog. There are no reported observations of either species and neither was observed during the field visit.

All the bat species listed for Gregory Point could potentially occur at the Yoakam site. Tree size is smaller and generally provides lower quality day and night roost when compared to Gregory Point which could limit the likelihood of use. The small cave on the northeast bay may also provide suitable roost areas. It is, however, apparently regularly visited by humans who would disturb any roosting bats. No observations of RTE bat species were reported and no RTE bat species were observed during the field visit.

The area around the intermittent stream may provide habitat for the little willow flycatcher. The upland and wetland areas to south also may provide habitat and flycatchers, if present, may move between areas to forage. No observations of the little willow flycatcher have been reported and none observed during the field visit.

Coos Head

Habitat. The Coos Head site is approximately 15 acres in size. It is bounded on the north and east by Coos Head Road and on the south by a private drive accessing several private residences. Originally a headland area similar to the other sites, the placement of the south jetty created a zone of aggredation forming the extensive sand flats along the north and west sides of the site. The site is 75 to 100 feet higher than the flats.

Past tree removal and natural disturbance have created a patchy multi-aged stand with an primary canopy of scattered large Sitka spruce, western red cedar, and western hemlock, 20-26 inches in diameter with some 36 inches or greater. The secondary canopy is a dense stand of spruce, western hemlock, and red alder 10-16 inches in diameter. The northeast part of the stand is generally younger with smaller diameters and fewer large remnant trees. Deciduous trees are more common in this area also.

The shrub layer is dominated by dense patches of salal and salmonberry with wax-myrtle. In some areas shading has begun to result in mortality within the shrub layer creating openings in the understory.

Canopy cover is 65-75% through most of the stands, but several small openings have no canopy and in other places it approaches 100%. Several 28 inch or greater snags were observed on the site, most along the northern and western edges. Coarse woody debris was limited throughout most of the site.

Special Features. Two small caves were observed near the northwest corner of the site. The cave roofs have begun to collapse and rock slides have partially blocked the entrances.

The terrain is generally rolling with several steep sided (35-45 degrees) drainages, which flow into a intermittent stream that bisects the site from south to north. The stream enters from the southwest corner, eventually flowing north over a waterfall off the site. The stream ranges from 1-4 feet in width and is usually less than 6-inches deep. The stream is generally well shaded by Sitka spruce with occasional red alder. Coarse woody debris is more abundant in the stream than elsewhere.

There is a series of three long, narrow ponds near the eastern edge of the site. The ponds are connected by short, deeply incised drainages. The southern most pond is approximately 10-feet wide by 30-feet long and 1-foot deep, the middle pond is 25 feet by 30 feet and appeared to be more than 3-feet deep. The northern pond is averages 30 feet in width and is approximately 150 feet in length and ranges from 1-4 feet deep. Surrounding vegetation is predominantly red alder with a dense understory of salal and salmonberry. There is no outflow channel. Water from the ponds appears to flow subsurface for 30-50 feet before emerging as seep downslope.

Water leaving the site forms a extensive wetland complex at the base of the cliffs. Vegetation in the wetland area is willow and red alder with various herbaceous species

Habitat Summary. The Coos Head site provides moderate quality habitat for a variety of wildlife by providing forage, nesting, roosting, and hiding cover, as well as moderating thermal extremes. The ponds, the intermittent stream, and their associated riparian areas increase the sites' value to wildlife.

Birds. A greater variety of birds were observed at the Coos Head site including chestnut-backed chickadee, black-crowned night heron, Cooper's hawk, mallards, killdeer, turkey vulture, and a bald eagle than at the other sites. This is probably due to differences in the time of the visit and the presence of the wetland areas. Table 6 contains a partial list of bird species that are known or likely to occur at the site.

Mammals. Douglas squirrel were observed on the site and evidence of use by black-tailed deer, elk, and beaver was seen. The evidence of beaver use was limited to the pond areas and appeared to be old. No evidence of recent beaver activity was seen. The relative lack of human disturbance, proximity to the larger forested/wetlands to the south, the sand flats and wetlands to the north, and vegetative structure of the stand makes it likely that the site is used by a variety of other mammals also. Table 7 contains a partial list of mammal species that are known or likely to occur at the site.

Reptiles and Amphibians. No reptiles or amphibians were observed on the site during the field visit. However, the presence of the intermittent stream and the ponds make it likely that a variety of amphibians use the site. Reptile use is probably limited. Table 8 contains a partial list of reptile and amphibian species that may occur on the site.

Rare, Threatened, and Endangered Species. RTE species potentially present at the site include: bald eagle; peregrine falcon; marbled murrelet; white-footed vole; long-eared, fringed, long-legged, and Yuma myotis; western big-eared bat; and red-legged frog.

A bald eagle was observed leaving the site during the May 25 field visit. The stand structure appears to provide limited nesting habitat, but may be used by eagles as a foraging perch or roost. Lowe (pers. comm., 1995) stated that he had not seen eagles use the stand during aerial surveys and did not believe that it contained suitable nesting habitat. No previous records of bald eagles at the site were reported. There is a known nest site approximately 3 miles to the south.

No nesting habitat is present for peregrine falcons. The presence of waterfowl and other birds in the sand flats and wetlands at the base of the north cliffs do provide potential foraging areas for falcons and they may be seen on the site. No records of falcons were reported for the site and none were observed during the field survey.

The site falls within the range of the murrelet (USDA et al., 1994). Murrelets are known to nest in second growth forests with old growth type structure such as large moss covered limbs. Several of the trees on the site had limbs and structure characteristics that could provide a nest platform for murrelets. No records of marbled murrelet occurrences were reported and none were observed during the field visit.

The intermittent stream and the ponds on the east side of the site provide potential habitat for white-footed vole and red-legged frog. No records of either species were reported for the area and neither was observed during the field visit.

Suitable habitat for the four myotis species and the western big-eared bat is present on the site. The two caves, crevices in the cliff, and the large trees and snags present provide potential day and night roost. The caves may be capable of providing sufficient thermoregulation to serve as winter hibernicula. The wetland areas, sand flats, and open areas in the site provide potential foraging areas. No records of any of the above species were reported and none of these species were observed during the field visit.

3.1.6.2 Environmental Consequences

No species specific surveys or quantitative assessments have been performed at any of the alternative sites. The USFWS has performed yearly, one day, nesting sea bird counts that provided information on use of the Gregory and Yoakam Point areas. In the absence of data to provide specific information on movement patterns, species assemblages, and high use areas, the following impact assessments are necessarily general and conservative in nature. It is recommended that additional surveys take place to provide this information, particularly with regard to RTE species. The BLM will consult with the USFWS on potential impacts to RTE species as required under Section 7 of the Endangered Species Act.

Gregory Point

Construction. The construction of the interpretive center at this site would result in the clearing of 6 acres for the placement of the parking lot, access road, and buildings. Table 10 presents a breakdown of impacts by habitat type. The preliminary site plan places the main building in the general area of the existing USCG housing which would limit the amount of native vegetation removed. Clearing for the interpretive trail would be limited to understory vegetation. Construction would result in fragmentation, reduction of habitat, and alteration of functional ability of the stand.

Table 10. Impacts by Habitat Type for Gregory Point

	Existing (acres)	Buildings (acres)	Parking/Road (acres)	Trails (feet)
Total Acres	31	1.9	4.1	6,275
Late Successional	14	0	1	2,550
Small Conifer	12	0.7	3.1	2,300
Shore Pine	3	0.5	0	650
Grass	2	0.7	0	875

Late successional forests are highly fragmented along the southern Oregon Coast and typically separated by long distances. The late-successional area of Gregory Point, although small and providing only minimal interior conditions, represents the only potential habitat for dependent species such as the marbled murrelet, various lichens, fungi, bryophytes, plants, arthropods, and small animals (USDA et al., 1994) in the general area. Other species, are in turn, at least partially dependent on late-successional plant and wildlife species for some or all of their life requirements.

The removal and alteration of habitat would effect the smaller and less mobile species greatest. The increased access to the interior of the stand may be expected to increase nest predation and competition for nest and foraging areas by edge species. The decrease in the ability of the site to mitigate weather extremes and maintain and interior microclimate would affect species such as amphibians that require generally stable, moist conditions, and species that seek the interior of the stand for protection from weather extremes. Removal of habitat would affect structural and vegetation diversity, thus decreasing nesting, foraging, and roosting habitats.

The site provides only a small portion of the home range of the larger wildlife species that may occur at the site (deer, elk, coyote) and performs no critical function related to their life requirements that may not be met in other areas of their home range. The direct impact from the construction of the proposed project would be limited for these species. General construction disturbance and day-to-day operation of the interpretive facility may decrease or eliminate use of the site by these species. Black-tailed deer and coyote have proven to be adaptable to human activity and may continue to use the site, dependent on the individual animals' tolerance.

If construction were to proceed as in the preliminary plan, little of the late-successional stand would be directly impacted. However, the clearing required for the placement of the parking lot, interpretive facility, and recreated Native American village would decrease the ability of the stand to buffer weather events and would increase predator access to the interior of the site. The soils of the area make the area susceptible to wind damage (Soils, Section 3.1.2). Roadways and other linear edges may increase the potential for large scale wind damage to the area during storm events.

Construction noise and activity may result in temporary abandonment of the site area by wildlife species, including seabirds. This may decrease the ability of various species to forage, rest, and/or reproduce. In may also result in unnecessary expenditure of energy in avoidance activities, which can adversely affect reproduction and over-winter survival.

These changes can be expected to result in an overall decline in the number and diversity of species using the site. Some species may abandon the site. The survival of those displaced species would depend on the carrying capacity of the surrounding land and individual adaptability. Mortality would be greatest to those less mobile species and/or those dependent on late successional stand characteristics.

Operation. Daily operation of the facility is expected to bring hundreds of visitors to the site. This would increase the amount of human-caused disturbance at the site, which may result in abandonment of the site by various individuals and disturbance reactions such as avoidance activities, with the same potential results as discussed in the construction phase. The projected increase in vehicle traffic to the area may also result in increased traffic caused mortality along the Cape Arago Highway.

The seabirds that are present on the outer bluffs and off-shore rocks are generally considered to be highly susceptible to disturbance (R. Lowe, pers. comm., 1995; J. Hodder, pers. comm., 1995). One of the operating alternatives for this site is to have guided tours to the lighthouse on Chief's Island. This may result in disturbance to seabirds roosting or breeding on the island. Seabirds in the area have been subject to regular disturbance by USCG maintenance activities in the past, and continue to use the island, although most activity is away from the lighthouse. The presence of larger groups of people and accompanying visual and acoustic disturbance would represent a new form of activity. This new disturbance could result in birds that had habituated to one type and intensity of activity avoiding the new activity by remaining some critical distance from the lighthouse area. There are no known studies available to suggest what that critical distance is.

Rare, Threatened, and Endangered Species. Potential impacts to RTE species are removal and alteration of habitat and disturbance from construction and operation activity. The potential impacts and the likelihood of impacts occurring is discussed below for each RTE species or group of species with the same habitat requirements.

Stellar's sea lion is not known to use the Gregory Point site, but it provides potential habitat and may be used. No potential habitat for Stellar's sea lion is proposed to be removed or altered for this project. The only potential effect this project may have on sea lions that might choose to use the site is noise disturbance from the construction activity and daily operation, which may be partly mitigated by surf noise, wind, and distance from construction activity to suitable habitat. Most of the suitable sites for sea lions to use as haul-out areas are screened by Squaw Island and Chief Island. These factors limit the likelihood of visual disturbance and the distance from the areas of human activity would limit the potential for noise disturbance.

Chief's Island and Squaw Island provide potential roosting and foraging habitat for Aleutian Canada geese. Roosting in the area may occur on an irregular basis, but is unlikely (R. Lowe, pers. comm., 1995). The regular USCG activity such as mowing the grass and maintenance of the lighthouse may have precluded use of the area by the geese. No activity is proposed that would directly alter or remove potential habitat. Noise and visual disturbance from construction and daily operation may have a disturbance effect on Aleutian Canada geese that could prevent the area from becoming a roosting/foraging area during migratory periods. Considering past use and projected use, it is likely that the proposed activity would result in no net affect to Aleutian Canada geese.

Lighthouse beach provides marginal nesting habitat for western snowy plovers due to the high level of tide effects. The beach may be used for foraging. No activity is proposed that would remove or alter potential habitat. No public access ways are planned to allow visitors to get down to the beach, and there is no other established public access to the beach, which limits the likelihood that visitors would have a direct impact on plovers. Noise from construction may cause some level of disturbance to foraging plovers, and may cause them to avoid the area closest to the point. The affects of noise disturbance would probably be limited.

Peregrine falcons have been observed in the area but are not known to be currently nesting in the immediate area. No suitable habitat for peregrines is proposed to be removed or altered. Peregrines probably use the area to roost and forage. Construction and daily operation activity may reduce peregrine use of the area by direct disturbance and by limiting the number of bird species in the area available for prey. Gregory Point probably makes up only a small portion of habitat available for peregrines; however, the seabird colonies at the site represent a substantial food resource. If the proposed project limits foraging opportunities it may negatively affect the survival and reproductive success of resident and migratory falcons.

Potential bald eagle perching and roosting habitat is present. The large trees within the stand could provide nesting platforms. Eagles may currently visit the site during random foraging activity and decrease the likelihood the eagles would chose to nest there. The proximity to Sunset Park and regular human activity associated with the park may limit use of the site by eagles, however. Some potential perch trees may be removed by construction. The reduction of stand size would decrease the thermoregulation ability of the stand and would make the site less desirable as a roost area.

Brown pelican are known to regularly roost on the off-shore rocks. No proposed action would remove or alter roosting habitat. Construction and operation activity may represent a disturbance to roosting pelicans and cause them to use roost areas farther from the Point or abandon the site as a roost. Pelicans may roost at different locations dependent on the season, weather, and time of day. The USCG maintenance and operation activity may have already limited use of roosting areas that could be impacted by visual and noise disturbance related to construction and operation. The potential increase in time and duration of noise and visual disturbance associated with the number of projected visitors may further limit the amount of roosting habitat pelicans currently have available. If pelicans react to the new disturbance level similar to the disturbance associated with USCG activities the project should have no net effect.

The project as proposed would alter and remove potential nesting habitat for the marbled murrelet. The primary affect would be decreasing the size of the overall stand. The smaller stand would provides less protection from nest predators, which are believed to be a major factor in murrelet nesting success. Daily operation may cause disturbance that would make the site unsuitable for nesting, or cause nesting murrelets to abandon the site, if they were present.

The project as proposed would alter and remove potential suitable habitat for the white-footed voles. The trail system would result in the removal of understory vegetation within 115 feet of the intermittent stream, and stand alterations would change the ability of the area to maintain the microclimate associated with forested riparian systems. Trail construction activity may also result in the removal of coarse woody debris that may be important for movement and denning. The presence of trails to the area would increase human presence in the area and potentially result in a disturbance effect. The response of white-footed voles to human activity is unknown.

The long-eared, fringed, long-legged, and Yuma myotis and the Pacific western big-eared bat, if present, could be impacted in a similar manner. Construction activity would remove or alter potential roosting and foraging areas. The thermo-regulatory ability of the stand would be reduced, snags and trees would be removed for building, road, and parking lot placement. These structures would also reduce available forage areas, and human presence within the stand increases the potential for accidental and deliberate disturbance of roosting bats.

Habitat for the little willow flycatcher is present at the site. However, habitat quality is generally limited. Construction of the entrance road, parking lot and trails would remove and alter potential nesting and foraging habitat. The affect of the human activity associated with daily operation is unknown.

The entire forested portion of the site provides potential habitat for red-legged frogs. The intermittent stream may provide breeding habitat and the upland areas may be used outside the breeding season. If present, construction would remove upland foraging habitat and create movement barriers. Daily operation would increase the likelihood of vehicle-caused mortality and human harassment.

Yoakam Point

Construction. The construction of the interpretive center at this site would result in the clearing of 5.4 acres for the placement of the parking lot, access road, and buildings. Table 11 presents a breakdown of impacts by habitat type. Clearing for the interpretive trail would be limited to understory vegetation.

Table 11. Impacts by Habitat Type for Yoakam Point

	Existing (acres)	Buildings (acres)	Parking/Road (acres)	Trails (feet)
Total Acres	22	2.7	2.7	6,275
Small Conifer	14	2.7	2.7	2,450
Shore Pine	2	0	0	0
Scrub/Shrub	6	0	0	350

General impacts to habitat and wildlife would be similar to Gregory Point but greater in severity due the small size and narrow shape of the Yoakam Point site. Construction following the preliminary plan would result in extensive habitat fragmentation, reduction of habitat, and alteration of functional ability of the stand.

The proposed access road and parking lot placement would impact the intermittent stream and riparian area on the south side of the point. Many species are dependent on open water and other unique habitat features associated with riparian areas. The impact of parking lot and road placement would degrade the riparian habitat.

The placement of the interpretive facility away from the rock outcrops and leaving intervening vegetation in place may limit potential disturbance due to construction noise to seabirds and marine mammals. This would result in an overall decrease in species abundance and diversity at the site.

Larger, more mobile species such as deer and elk would be affected least, as the site represents only a small portion of their home range. The construction would have the greatest impact on the smaller less mobile species, or those with specific habitat requirements, such as amphibians, small mammals, and forest-dwelling birds. Some species may abandon the site. The survival of those displaced species would depend on the carrying capacity of the surrounding land and individual adaptability. Mortality would be greatest to those less mobile species and/or those dependent on late successional stand characteristics.

Operation. The same number of daily visitors and vehicles are expected for the Yoakam Point site as Gregory Point and impacts to wildlife species due to daily operation would be similar: direct visual and auditory disturbance and harassment. The location of the interpretive center may decrease the disturbance potential for seabirds and marine life because it would be screened by vegetation. The proposed trail out to the point area would allow visitors access to the rocks. Visitors would be visible to birds and animals in the area, but it is expected that number of visitors present at the point and the amount of associated noise and visual disturbance would be less relative to Gregory Point, where the main interpretive center would be in direct line of site with Chief's Island.

Rare, Threatened, and Endangered Species. Potential impacts to RTE species are similar to the potential impacts related to the Gregory Point site. Impact that may occur at the Yoakam Point site include removal and alteration of habitat and disturbance from construction and operation activity. The potential impacts and the likelihood of impacts occurring is discussed below for each RTE species or group of species with the same habitat requirements.

Stellar's sea lion is not known to use the Yoakam Point site. The available habitat is generally poor, the rocks are steep sided, with few flat areas for hauling out. Most sites that may be used by sea lion are located at the extreme tip of the point area. No potential habitat for Stellar's sea lion is proposed to be removed or altered for this project. The only potential effect this project may have on sea lions that might choose to use the site is noise disturbance from the construction activity, which may be partly mitigated by surf noise, wind, and distance from construction activity to suitable habitat and activity associated with regular daily operation. The lack of haul-out areas make it unlikely that Stellar's sea lion would use the Yoakam Point area. Most habitat is located outside the distance that disturbance from construction or operation of the facility would be discernible. It is unlikely that the Yoakam Point alternative would directly affect Stellar's sea lion

Aleutian Canada geese may roost in the area on an irregular basis, but it is unlikely (R. Lowe, pers. comm., 1995). No activity is proposed that would directly alter or remove potential habitat. Noise and visual disturbance from construction and daily operation may have a disturbance effect on any Aleutian Canada geese choosing to use the site. The limited habitat and lack of sightings suggest that the proposed activity would have a low probability of adversely affecting Aleutian Canada geese.

Bastendorff beach provides foraging habitat for the western snowy plover, but is marginal nesting habitat due to the level of human activity. No activity is proposed that would remove or alter potential habitat. No public access ways are planned to allow visitors to get down to the beach. Noise from construction may cause some level of disturbance to foraging plovers, and may cause them to avoid the area closest to the point. The number of visitors to the interpretive center would most likely increase the number of people visiting Bastendorff Beach resulting in increased disturbance potential.

Peregrine falcons may potentially use the area to roost and forage. Peregrine falcons have been observed in the general area. No suitable habitat for peregrines is proposed to be removed or altered. Construction and daily operation activity may reduce peregrine use of the area by direct disturbance and by limiting the number of bird species in the area available for prey. Yoakam Point probably makes up only a small portion of habitat available for peregrines and the impacts of this alternative would be minimal.

Potential bald eagle perching habitat is present and bald eagles are known to be in the general area. Eagles probably visit the site during random foraging activity. Some potential perch trees may be removed by construction. The proposed activity would remove potential perch trees and the disturbance caused by construction and operation may limit use of the site.

Brown pelican have been observed roosting at Yoakam Point. No proposed action would remove or alter roosting habitat. Construction and operation activity may represent a disturbance to roosting pelicans and cause them to use roost areas farther from the point or abandon the site as a roost. Without specific knowledge of what area the pelicans use it is impossible to determine the potential likelihood and severity of these impacts, although most pelicans probably roost at the seaward edge of the rocks. The distance may be sufficient to reduce or eliminate noise and visual disturbance. If this is the case, then the proposed activity would have limited potential to impact the brown pelican.

The project as proposed would remove and alter potential marbled murrelet nesting habitat. The primary affect would be decreasing the size of the overall stand and the potential removal of suitable nest trees. The smaller stand would provides less protection from nest predators, which are believed to be a major factor in murrelet nesting success. Daily operation may cause disturbance that would make the site unsuitable for nesting, or cause nesting murrelets to abandon the site.

The project as proposed would remove and alter suitable habitat for white-footed voles. Knowledge of the life requirements for the vole is limited so determination of the level of impact is difficult to assess. The placement of the access road and parking lot would eliminate potential habitat and stand alterations would change the ability of the area to maintain the microclimate associated with forested riparian systems. Construction activity may also result in the removal of coarse woody debris that may be important for vole movement and denning. The presence of the road and parking lot would increase human presence in the area and potentially result in a disturbance effect as well as increase the likelihood of vehicle-caused mortality. The response of white-footed voles to human activity is unknown.

The long-eared, fringed, long-legged, and Yuma myotis and the Pacific western big-eared bat, if present, would be impacted in a similar manner. Construction activity would remove or alter potential roosting and foraging areas. The thermo-regulatory ability of the stand would be reduced, snags and trees would be removed for building, road, and parking lot placement, these structures would also reduce available forage areas, and human presence within the stand increases the potential for accidental and deliberate disturbance of roosting bats. The small cave on the east side of the point is already subject to human disturbance potentially sufficient to make the cave unsuitable for bats. The potential increase in visitors to Bastendorff Beach would increase the amount of human disturbance around and in around the cave. If the bats are already excluded from the cave this would have no direct impact. If bats do use the cave, the increase in human activity may result in disturbance.

Habitat for the little willow flycatcher is present at the site. Construction of the entrance road, parking lot and trails would remove and alter potential nesting and foraging habitat for this species. The effect of the human activity associated with daily operation is unknown.

The entire forested portion of the site may be used by red-legged frogs. The intermittent stream may provide breeding habitat and the upland areas may be used outside the breeding season. Construction, particularly of the access road and parking lot, would remove upland foraging habitat and create movement barriers. Daily operation would increase the likelihood of vehicle-caused mortality and human harassment.

Coos Head

Construction. The construction of the interpretive center at the Coos Head site would result in the clearing of 5 acres for the placement of the parking lot, access road, and buildings. Table 12 presents a breakdown of impacts by habitat type. Clearing for the interpretive trail would be limited to understory vegetation.

Table 12. Impacts by Habitat Type for Coos Head

	Existing (acres)	Buildings (acres)	Parking/Road (acres)	Trails (feet)
Total Acres	15	2.3	2.7	1,900
Mixed-age Conifer	11	2	2	1,650
Mixed Conifer/ Deciduous	4	0.3	0.7	250

General impacts to habitat and wildlife would be similar to the other alternative sites. Construction following the preliminary plan would result in habitat fragmentation, reduction of habitat, and alteration of functional ability of the stand.

The construction would impact the intermittent stream and ponds and their associated riparian areas. Many species are dependent on open water and other unique habitat features associated with riparian areas. Construction would degrade riparian habitat by removing vegetation and creating movement barriers.

These changes would result in an overall decrease in species abundance and diversity at the site. Larger, more mobile species such as deer and elk would be affected least, as the site represents only a small portion of their home range. The construction would have the greatest impact on the smaller, less mobile species, or those with specific habitat requirements, such as amphibians, small mammals, and forest-dwelling birds. Unlike the other alternative sites, no seabirds or marine mammals use or are suspected to use this site. Some species may abandon the site. The survival of those displaced species would depend on the carrying capacity of the surrounding land and individual adaptability. Mortality would be greatest to those less mobile species and/or those dependent on late successional stand characteristics.

Operation. Impacts to wildlife species due to daily operation would be similar to impact at the other sites; direct visual and auditory disturbance and harassment. There would be no direct disturbance to sea birds or marine mammals if the facility were located at the Coos Head site.

Rare, Threatened, and Endangered Species. Potential impacts to RTE species are similar to the potential impacts related to the other two alternative sites with the exception of Stellar's sea lion, Aleutian Canada geese, and brown pelican. There would be no direct impacts to these species from construction and operation at this site. Impacts that may occur at the Coos Head site include removal and alteration of habitat and disturbance from construction and operation activity.

No Action Alternative

Wildlife. There would be no potential adverse impacts to wildlife species under the No Action Alternative.

Rare, Threatened, and Endangered Species. There would be no potential adverse impacts to RTE wildlife species under the No Action Alternative.

3.1.6.3 Mitigation Measures

Gregory Point

Potential mitigation measures that could reduce impacts to wildlife at Gregory Point include the following:

- A seasonal operating restriction on construction involving heavy machinery (grading, clearing, tree removal, etc.) should be implemented to reduce disturbance potential to breeding sea birds. Operating restriction dates should be developed with assistance from the USFWS and ODFW.
- Existing snags over 6 inches in diameter should be left standing.
- Existing coarse woody debris greater than 8 inches in diameter should be left in place. Coarse woody debris that must be moved should be transferred to undisturbed areas on the site when possible without disturbing native vegetation.
- Green trees that must be removed should be left, or placed within the stand to provide additional coarse woody debris.
- Vegetation removal should be limited to the extent necessary for construction and operation, while meeting health and safety codes.
- Existing trails on the site that would not be used as interpretive trails should be scarified and restored through native vegetation planting.
- Access to Chief's Island should be limited to basic maintenance of the lighthouse and scientific research approved by the BLM and USFWS.
- Limit visitor access to well defined trails through signs and interpretive session to limit disturbance to the forested areas.
- To avoid disturbance to nesting seabirds, a critical distance from nest sites necessary to prevent disturbance should be determined through discussion with ODFW and USFWS. Construction of trails and interpretive messages should be designed to maintain that distance.

Yoakam Point and Coos Head

Potential mitigation measures for Yoakam Point and Coos Head are similar to Gregory Point.

3.1.6.4 Northwest Forest Plan

Gregory Point and Coos Head are managed by the BLM and thus fall under the management standards and guides set forth in the *Northwest Forest Plan* (USDA and USDI, 1994). The Aquatic Conservation Strategy Standards and Guides and the Survey and Manage Standards and Guides sections of the plan would apply to both sites.

Aquatic Conservation Strategy. The Aquatic Conservation Strategy was designed to enhance and protect the functions of watershed and aquatic ecosystems. The goal of the strategy is to maintain and restore habitat for fish and other riparian dependent species. The streams on the Gregory Point and Coos Head sites are considered intermittent ("nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition." [USDA and USDI, 1994]). Intermittent streams (Gregory Point, Coos Head) and wetlands less than one acre (Gregory Point) and natural lakes and ponds (Coos Head) have specific guides associated with them. Under the guides, a riparian reserve is established around specific areas (streams, wetland or lakes/ponds) within a watershed. The minimum width of a riparian reserve for an intermittent stream or wetland less than 1 acre must include the following:

- The extent of unstable and potentially unstable areas, including earthflows;
- The stream channel and to the top of the inner gorge;
- The stream channel or wetland and the area from the edges of the stream channel or the wetland to the outer edges of the riparian vegetation; and
- The extension from the edges of the stream channel to a distance equal to the height of one site-potential tree (average maximum height possible of the dominant tree given).

The riparian reserve specified for the ponds at the Coos Head site would include:

- The pond;
- The area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil; or,
- To the extent of unstable, and potentially unstable areas; or,
- To a distance equal to the height of two site-specific trees, or 300 feet slope distance, whichever is greater.

BLM has adopted a methodology for determining site potential trees (BLM, 1995). This method relies on specific on-site measurements do determine a "site index," which may be used to determine the site potential tree height. These measurements were not part of the original project scope and were not taken during the site visit. In the absence of these measurements, it is suggested that the average height of the dominant tree for the site be used. The dominant tree species for both sites is Sitka Spruce, which attain an average height of 200 feet (Burns and Honkalal, 1990).

The widths of the riparian reserves apply until a watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for final riparian reserve boundaries is presented through the appropriate NEPA process. A watershed analysis also is required to determine if the proposed activity meets the aquatic conservation strategy. Any action such as road building or trail construction that does not meet the aquatic conservation strategy should not be implemented. Generally, most land management activities, except timber harvest, within a riparian reserve with a completed watershed analysis that meets, or does not prevent attainment of, the aquatic conservation strategy objectives and complies with the standards and guides, are allowed.

Survey and Manage. These standards and guidelines are designed to provide protection to various vascular plants, non-vascular plants and fungi, invertebrates, amphibians, and mammals. There are four components to the standard and guide; however, only the Survey *prior to ground-disturbing activities* component is known to apply for wildlife at the Gregory Point and Coos Head Sites. Seventy-nine species are on the survey and manage list; however, surveys only need to take place within the known or suspected range and particular habitats that each species is known to occupy. Surveys for eight species (Del Norte, Larch Mountain, Shasta, Siskiyou, and Van Dyke's salamanders, red tree voles, and Canadian lynx) of the 79 species listed under *survey prior to ground disturbing activities* category, must take place prior to the design of all ground-disturbing activities that would begin in fiscal year 1997 or later. Surveys for the remaining species must be conducted prior to any ground-disturbing action that would occur in fiscal year 1999 or later. A complete list of survey and manage species may be found in Table C3 of the Record of Decision (USDA and USDI, 1994). Coos Head and Gregory Point both fall within the range of the red tree vole and potential habitat is present. If the construction takes place after 1997, surveys for red tree voles must be conducted.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction on operation of the center would occur.

3.1.7 WETLANDS

In addition to ground reconnaissance of the sites, existing aerial photographs, soil survey, and available maps were consulted to aid in identifying wetlands and other aquatic features.

3.1.7.1 Affected Environment

Regional

The three proposed development sites are similar in their geologic origins and subsequent landform and soils development (see Section 3.1.1 and 3.1.2). Each is relatively planar, being formed from uplifted marine terraces, and are relatively isolated from larger hydrologic sources. Determining the presence or absence of wetlands on each site requires indicators of hydric soils, wetland hydrology, and hydrophytic vegetation as outlined in the U.S. Army Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory, 1987). The recent mapping of the Blacklock soil series on each of the sites (SCS, 1989) indicates that hydric soils are likely to be present in some areas. The USFWS National Wetland Inventory map of the Charleston, Oregon quadrangle (NWI, 1989) identifies extensive marine, estuarine, riverine, and palustrine wetlands in the general area, though virtually no wetland on any of the sites proper.

Wetlands present within the proposed development sites are limited both in size and functional value, with the exception of the wetland directly beneath the north-facing slopes of Coos Head. Nevertheless, each site contains at least one intermittent drainageway that transports seasonal flows across the site and onto adjacent intertidal or beach areas. These wetland features influence both habitat and water quality at each site. The presence of Blacklock soil could indicate a near-surface perched water table situation in some areas, though the vegetation did not generally appear to reflect stresses from prolonged soil saturation. Generally, moist conditions can be expected in the area from ambient rainfall, favoring a community of facultative plants without stresses associated with wetland conditions.

Gregory Point

Potential wetland conditions have been noted in the Oregon Parks and Recreation Department Staff Report Summary for Gregory Point based on the mapping of the hydric Blacklock soil series over the entire point. However, ground inspection of Gregory Point revealed three minor wetland resources within the proposed development area. An intermittent drainageway in the southeast corner of the site transports surface water culverted from east of Cape Arago Highway as well as groundwater collected from the surrounding land. The drainageway trends southward, its lower reaches gradually widening and supporting a small community of hydrophytic vegetation dominated by skunk cabbage. A small ravine extends a short distance to the northwest off the main drainage, adding surface and groundwater flows from the upper terrace. The drainage ultimately flows offsite into a culvert beneath the grass lawn and parking lot in Sunset Bay State Park before being discharged onto the beach.

An emergent to shrub-dominated wetland is located in a relatively open area of the north-central portion behind a building on the Coast Guard station access road. The area has been logged more recently than other areas on the Point, and favors a heavier undergrowth of herbaceous species and low shrubs. The soil profile revealed a black, peaty organic surface layer up to 8 inches deep, underlain by a dark gray silty clay layer. The cemented sand layer typical of Blacklock soils was not encountered, though it may have been present at a greater depth, contributing to a perched water table in this area. The hydrophytic vegetation is not particularly strong, though occasional small clumps of slough sedge are scattered about the opening. Small patches of sphagnum moss indicate prolonged wet conditions as well. Shrubs such as salal and evergreen huckleberry appear to be invading the opening.

A third wetland area is located in a small depression in the northwestern portion of the site. The depression is dominated by grasses with a shrub periphery, and appears to collect surface water on a seasonal basis.

The exact extent and location of wetlands on Gregory Point and the alternative sites would require a wetland delineation and confirmation by the U.S. Army Corps of Engineers and the Oregon Division of State Lands.

Yoakam Point

Field inspection of Yoakam Point revealed a single intermittent stream that enters the site via a 24-inch diameter culvert beneath Cape Arago Highway just west of the existing turnout. The drainageway meanders northward, ultimately draining into the intertidal zone between the second and third rocky points. The drainageway is primarily incised, with surface flows often disappearing underground. Consequently, only a few small patches of slough sedge are associated with the drainageway. In addition, an old roadway that crosses the drainage in the southwest portion of the site maintains a seasonally perched water table that supports patches of slough sedge. Total wetland associated with the roadway and stream channel is probably less than 0.05 acres, though determining the actual area of wetland on the upper terrace would require additional sampling.

A larger wetland lies just offsite along the west edge of Bastendorff Beach. Surface and groundwater supplies maintain a high water table along the east base of Yoakam Point, supporting a mixed shrub/emergent community dominated by Hookers willow, twinberry, and sedges.

Coos Head

Coos Head contains a single intermittent stream that enters the site from the southwest corner and flows northward onto the sand flats at the base of the headland. The main drainageway collects additional flows from at least two minor tributaries; each carries only stormwater flows. Primarily incised, the drainageway supports a small wetland community of slough sedge and salmonberry near the southwest corner of the property, as well as a few isolated patches of slough sedge confined to the drainage channel.

A second drainageway has formed in conjunction with a series of old log ponds near the eastern edge of the site. An old roadbed entering the treeline from the main road experiences ponding in a depressional area roughly 10 feet by 30 feet. Overflows from this depression enter a larger excavated pond of at least 900 square feet a short distance to the northwest. This second water body feeds yet another log pond. This pond averages 30 feet in width and is approximately 150-feet long. The two larger log ponds are 1-4 feet deep. No obvious offsite sources of water contribute to these ponds; apparently, rainfall and groundwater movement provide sufficient water to maintain pond depths. Each pond supports a dense border of salmonberry, red alder, twinberry, salal, and slough sedge.

The third pond feeds a swale that ultimately enters a broad ravine at the northeast edge of the headland. Unstable saturated soils in the steeply sloping ravine have contributed to periodic slumping, gradually uprooting several mature red alder trees.

Surface runoff from both the south/north drainageway and the pond system feed into the wetland on the sandy flats north of Coos Head. This wetland area experiences seasonal ponding, mostly drying up by late spring except immediately beneath the cliff faces. The wetland plant community consists of a mosaic of scrub/shrub clumps composed of willow, twinberry, spruce, and salal, interspersed with sedge-dominated open areas.

3.1.7.2 Environmental Consequences

Gregory Point

Possible impacts to water features by construction activities include an increase in silty or polluted runoff into the drainageway and removal of vegetation cover essential to water quality maintenance. Diversion of surface flows could adversely affect existing vegetation within the drainageway, as could increased flows with greater sediment and pollutant loads. Vegetation cover presently shades the drainageway and inputs organic material that helps to regulate the rate of water flow out of the system. This function would be diminished with impacts to vegetation. Impacts to wetland during operation of the facilities may involve water quality degradation due to spills of oil or other toxic substances, sedimentation associated with newly disturbed soils, and vegetation damage from pedestrians.

Yoakam Point

Degradation of surface runoff through sedimentation and potential spills of oils or other toxics are possible during construction and thereafter associated with the parking area. Clearing activities and the location of buildings may impact vegetation cover adjacent to or within the drainageway with subsequent negative affects on water quality and wildlife use.

Coos Head

Impacts from construction and operation of the interpretive facility may affect the north/south drainageway, which passes between the proposed interpretive center and parking lot. As at the other sites, degradation of surface runoff through sedimentation and potential spills of oils or other toxics are possible during construction and thereafter associated with the parking area. Clearing activities and the location of buildings may impact vegetation cover adjacent to or within the drainageway with subsequent negative affects on water quality and wildlife use.

The ponds may attract additional pedestrian travel, introducing heavier burdens on border vegetation, bank stability, and water quality.

Surface flows from the north/south drainageway, the pond system, and seepage from the bluffs on the north side of Tunnel Point all enter the system of wetlands on the sand flats north of the point. Impacts to the quantity and quality of water entering these flats may have deleterious effects on the wildlife and plants inhabiting the area.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.7.3 Mitigation Measures

Potential mitigation measures common to all sites include the following:

To minimize soil erosion into drainageways and wetlands, construction activities should use best management practices at all times (see Appendix). Appropriate erosion control measures should be in place at all times to control sediment movement. Construction activities in steep ravines and areas of unstable soils should be avoided wherever possible.

Measures to protect wetland areas from spills of motor oil or other toxic substances should be in place from initial construction stages. Detention facilities should be in place to hold spills a sufficient time to be cleaned up, before discharge of treated water to drainageways or ponds.

Native vegetation within a prescribed distance around each water feature should not be impacted in order to maintain soil integrity and minimize invasion of non-natives into the sensitive areas. In addition, removal of overstory cover on this scale would most likely favor heavier shrub growth in open areas, which may prove undesirable despite native status.

Pedestrian access to sensitive wetland areas and drainageways should be carefully planned and controlled, through established trail systems, public education, and possibly restricted access guided walks.

3.1.8 AQUATIC ECOLOGY

3.1.8.1 Affected Environment

Regional

Two distinct intertidal habitats are found at the three sites: rocky shores and exposed sandy beach. Rocky shore habitat exists in the intertidal zones of the Yoakam Point and Gregory Point sites, while exposed sandy beach habitat occurs at the Coos Head and Yoakam Point sites.

Community structure and distribution of plants and animals within these habitats is influenced by many factors, including organism tolerance to inundation and exposure and daily and seasonal changes in temperature and salinity, organisms ability to withstand wave shock, and competition between organisms for available resources

(Carefoot, 1977). Variation of these factors along a tidal gradient between the extreme high tide and extreme low tide levels contributes to clearly distinguishable communities of plants and animals within the intertidal zone. To describe the different intertidal communities, biologists have developed an intertidal zone classification system.

Several resource management agencies and institutions were contacted in the search for site specific information, including the BLM, the Confederated Tribes, the Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the Oregon Parks and Recreation Department, the Oregon Institute of Marine Biology (University of Oregon), the Hatfield Marine Science Center (Oregon State University), and the National Marine Fisheries Service. Very little published information was available from these resources on the structure and composition of intertidal zone communities of the rocky shores and exposed sandy beach habitats at these particular sites. The following discussion of community composition and distribution of organisms in the rocky shores and exposed sandy beach intertidal zone habitats is based primarily on descriptions of organisms typically found in these habitats within the Pacific Northwest. Descriptions of community composition in these different zones generally focuses on the most common and larger, more visible flora and fauna (e.g, fishes, seaweeds, and invertebrates) and is not intended to be a list of all species that are or could be present.

Gregory Point

Communities of aquatic biota within the rocky shore habitats at the Gregory Point site can be divided into four intertidal zones with clearly distinctive communities: the splash or upper intertidal zone (about +12 to +7 feet above mean lower low water, 0.0 feet), the upper middle intertidal zone (about +3 to +7 feet), the lower middle intertidal (about 0.0 to +3 feet), and lower intertidal zone (about -2 feet to 0.0) (Kozloff, 1983). Although biologists have classified these zones along clearly identifiable tidal levels, there are not necessarily clear boundary lines between these zones and some organisms may occur in more than one zone. Some of the more mobile species listed in specific zones, such as fishes, actually move between zones following the incoming and receding tides. The scientific and common names of lichens, seaweeds, fishes, and invertebrates commonly found in these various intertidal zones are presented in Table 13.

The spray or upper intertidal zone is generally a very dry area located above the average high tide level, and is exposed to salt spray and wave splash primarily during the highest high tides and storm events. Relatively few species of aquatic plants and animals can tolerate the extreme temperatures and long dry periods characteristic of this zone. This zone is easily recognizable by the presence of a band of encrusting black lichens (e.g., *Verrucaria maura*). A few species of snails, periwinkles, limpets, and acorn barnacles also are common in this zone (Snively, 1983).

Below the spray zone is the upper middle intertidal zone, which is exposed to much more wave action, daily inundation, and shorter periods of exposure. Due to these less extreme conditions, the upper middle intertidal zone community is consequently a more diverse assemblage of plants and animals, including many of the species (e.g., common

Table 13. **Partial list of common lichens, invertebrates, macroalgae, and other life forms of rocky shore intertidal habitats**

Habitat	Life Form	Scientific Name	Common Name
Upper Intertidal (splash) zone			
	Lichens	*Caloplaca* sp.	
		Physcia caesia	
		Prasiola meridionalis	
		Verrucaria sp.	black encrusting algae
		Xanthoria sp.	
	Macroalgae (Seaweeds)	*Enteromorpha intestinalis*	sea hair
	Invertebrates	*Balanus glandula*	common acorn barnacle
		Collisella digitalis	finger limpet
		Cthhamalus dalli	small acorn barnacle
		Ligia pallasii	isopod
		L. occidentalis	isopod
		Littorina scutulata	checkered periwinkle
		L. sitkana	Sitka periwinkle
		L. keenae	gray periwinkle
		Notoacmea persona	speckled limpet
Upper middle intertidal zone			
	Macroalgae	*Bangia fuscopupurea*	bald sea hair
		Cladophora columbiana	cladophora
		Endocladia muricata	sea moss
		Fucus distichus	rockweed
		Gigartina papillata	
		Hildenbrandia sp.	
		Iridaea cornucopieae	
		I. cordata	
		Pelvetiopsis limitata	brown rockweed
		P. fastigiata	
		Porphyra spp.	
		Urospora penicilliformis	
	Invertebrates	*Acanthina spirata*	angled unicorn
		Balanus glandula	common acorn barnacle
		Chthamalus dalli	small acorn barnacle
		Collisella asmi	
		C. paradigitalis	
		C. pelta	shield limpet
		Crepidula adunca	hooked slipper shell
		Nucella canaliculata	channeled whelk
		N. emarginata	rock whelk
		N. lamellosa	wrinkled whelk
		Pachygrapsus crassipes	lined shore crab

Table 13. (continued)

Habitat	Life Form	Scientific Name	Common Name
Upper middle intertidal zone (continued)			
		Pagurus granosimanus	granular hermit crab
		P. hirsutiusculus	hairy hermit crab
		P. samuelis	hermit crab
		Tegula funebralis	black turban snail
Lower middle intertidal zone			
	Fishes	*Anoplarchus purpurescens*	cockscomb prickleback
		Apodichthys flavidus	penpoint gunnel
		Artedius lateralis	smoothead sculpin
		Ascelichthys rhodorus	rosylip sculpin
		Clinocottus globiceps	mosshead sculpin
		C. acuticeps	sculpin
		Gobiesox maeandricus	flathead clingfish
		Oligocottus maculosus	tidepool sculpin
		O. rimensis	saddleback sculpin
		O. snyderi	fluffy sculpin
	Macroalgae	*Acrosiphonia coalita*	
		Gigartina agardhii	
		G. papillata	
		Halosaccion glandiforme	sea sac
		Hedophyllum sessile	sea cabbage
		Hildenbrandia spp.	
		Iridaea cordata	
		Leathesia difformis	sea cauliflower
		Lithothamnium philippi	rock crust
		Mastocarpus papillatus	
		Microcladia borealis	
		Postelisa palmaeformis	sea palm
		Ulva fenestrata	sea lettuce
	Invertebrates	*Anthopleura elagantissima*	aggregate anemone
		Calliostoma ligatum	blue top shell
		Collisella pelta	
		C. paradigitalis	
		Cirolana harfordi	
		Cucumaria curata	sea cucumber
		C. pseudocurata	sea cucumber
		Dodecaceria fewkesi	
		Granulina margaritula	
		Hemigrapsus nudus	purple shore crab
		Homalopoma luridum	
		Idotea stenops	
		I. wosnesenskii	rockweed amphipod
		Katharina tunicata	black chiton
		Lepidochitona dentiens	top shell
		Lephopanopeus bellus	black-clawed crab

Table 13. (continued)

Habitat	Life Form	Scientific Name	Common Name
Lower middle intertidal zone (continued)			
	Invertebrates	*Lirularia succincta*	
		Lottia gigantea	owl limpet
		Mytilus californianus	California mussel
		Nereis vexillosa	pile worm
		Notoacmea scutum	plate limpet
		Nucella canaliculata	channeled whelk
		N. emarginata	rock whelk
		N. lamellosa	wrinkled whelk
		Nuttallina californica	
		Onchidella borealis	
		Pisaster ochraceus	purple or ochre star
		Petrolisthes cinctipes	porcelain crab
		Pollicipes polymerus	goose neck barnacle
		Semibalanus cariosus	thatched acorn barnacle
		Tetraclita rubescens	acorn barncacle
Lower Intertidal Zone			
	Fishes	*Brachyistius frenatus*	kelp perch
		Embiotoca lateralis	stiped seaperch
		Hemilepidotus hemilepidotus	red Irish lord
		Hexogrammos decdagrammus	kelp greenling
		Rhamphocottus richardsoni	grunt sculpin
		Scorpaenichthys marmoratus	cabezon
	Seagrasses	*Phyllospadix scouleri*	surf grass
	Seaweeds	*Alaria marginata*	alaria
		Codium fragile	sea staghorn
		C. setchellii	
		Costaria costata	seersucker
		Cytoseira osmundacea	
		Desmarestia ligulata	acid kelp
		D. viridis	
		Egregia menziesii	feather boa
		Hedophyllum sessile	sea cabbage
		Iridaea cordata	
		I. flaccida	
		Laminaria setchellii	split kelp
		Laurencia spectabilis	
		Lessoniopsis littoralis	
		Macrocystis integrifolia	perennial kelp
		Nereocystis luetkeana	bull kelp
		Odanthalia washontonensis	
		Plocamium sp.	
		Pterygophora californiaca	

Table 13. (continued)

Habitat	Life Form	Scientific Name	Common Name
	Invertebrates	*Cancer productus*	red crab
		Ceratostoma foliatum	leafy hornmouth
		Dermasterias imbricata	leather star
		Diodora aspera	keyhole limpet
		Haliotis walallensis	abalone
		Henricia leviuscula	blood star
		Idotea aculeata	
		I. montereyensis	Monterey isopod
		I. kirchanskii	
		Lacuna marmorata	clink-shell
		Lepidozona cooperi	Cooper's chiton
		Notazcmea insessa	
		N. paleacea	
		Pisaster ochraceus	purple or ochre star
		Placiphorella velata	veiled chiton
		Pycnopodia helianthoides	sea star
		Rostanga pulchra	nudibranch
		Stolaster stimpsoni	sun star
	Sea Anemones & their allies	*Anthopleura xanthogrammica*	giant green anemone
		Balanophyllia elegans	orange cup coral
		Cnidopus ritteri	
		Cornyactis californica	
		Epiactis prolifera	brooding sea anemone
		Urticina crassicornis	
	Sea Urchins	*Strongylocentrotus purpuratus*	purple sea urchin
	Sponges	*Halichorndria panicea*	bread-crumb sponge
		H. permollis	
		Lissodendoryz firma	
		Ophlitaspongia pennata	

Sources: USFWS, 1980; Kozloff, 1983; Snively, 1983; Brosnan and Crumrine, 1992 acorn barnacle and limpets) found in the spray zone. The upper part of this zone is sometimes referred to as the barnacle zone (Snively, 1983). The barnacles here are generally more numerous and larger than those in the splash or upper intertidal zone. Other invertebrates and seaweeds commonly found in this zone include hermit crabs, shield and plate limpets, black turban snail, rockweeds, sea lettuce, sea moss, and bald sea hair. From a distance, this zone appears to be a greenish band due to the dense growth of seaweeds. In the spring and summer, beneath living or decaying seaweeds,, there are often large numbers of isopods, amphipods, crabs, and other crustaceans.

The lower middle intertidal zone lies immediately below the upper middle intertidal zone where it is inundated for longer durations and experiences less extreme variations in temperature and salinity. Some of the plants and animals in the upper middle intertidal zone (e.g., rockweeds, snails, and limpets) also are found in this zone but generally become less abundant and are interspersed among several species of plants and animals not generally found in the upper middle intertidal zone. Species of plants and animals commonly found in the lower middle intertidal include California mussel, goose neck barnacle, chitons, anemones, purple sea star, and several more fleshy seaweeds like sea palm, sea cauliflower, and sea cabbage. In addition, several species of fish, including sculpins, penpoint gunnel, clingfish, and cockscomb prickleback are found in tide pools within this zone.

Immediately below the lower middle intertidal zone is the lower intertidal zone. This zone has the greatest amount of microhabitat diversity and a more diverse assemblage of plants and animals than any of the other intertidal zones. Tide pools in this zone are generally exposed only a few times each month during the lowest low tides. Red, green, and brown seaweeds often form complete cover of the rocks in this zone providing cover and food for numerous other organisms (e.g., crabs, mollusks, surfperches, sea stars, and anemones). In addition to some of the plants and animals found in the lower middle intertidal zone, species commonly found in the lower intertidal communities include split kelp, perennial kelp, feather boa, acid kelp, bull kelp, purple sea urchin, various sea stars, keyhole limpet, giant green anemone, and brooding anemone. Fishes that use rocky shore intertidal zone habitats include various surfperches, greenling, and sculpins.

The intertidal and subtidal zones south of Gregory Point and Chief's Island are designated as a Research Reserve in the *Territorial Sea Plan* (Oregon Ocean Policy Advisory Council, 1994). The management prescriptions include no new or improved access to the water area and discourage public access to Chief's Island.

Yoakam Point

Yoakam Point has a similar rocky shore habitat described at Gregory Point. In addition, exposed sandy beach intertidal habitat at Yoakam Point (Bastendorff Beach) supports a less diverse assemblage of plants and animals than the more productive and complex rocky shores habitat. Although somewhat less evident than the intertidal zonation of rocky shores, exposed sandy beach habitats also can be divided into upper, middle, and lower intertidal communities. The food web in these communities is generally composed of microscopic plants (i.e., phytoplankton), fragments of dead or dying seagrasses and seaweeds (detritus), assorted plant-eating organisms, decomposers or scavengers that feed on the phytoplankton and detritus, and the predators that feed on the plant eaters and decomposers. The scientific and common names of seaweeds, fishes, and invertebrates commonly found in exposed sandy beach intertidal zones are presented in Table 14.

The upper intertidal zone of exposed sandy beach habitats is often composed of a number of decomposers that feed on detritus (wrack) deposited along the high tide line. Numerous small crustaceans, including amphipods, isopods, shrimp, and crabs are associated with this debris and live at or just below the sand surface in the vicinity of the water line. Animals commonly found in this zone include beach hoppers, water-line isopod, opossum shrimp, crago shrimp, mole crab, and hairy amphipod. Some of the organisms listed only in the upper intertidal zone move between zones following the incoming and receding tides.

Middle and lower intertidal zone communities include some members found in the upper intertidal zone as well as a few species of shellfish and plants not generally found in the upper intertidal zone. The purple olive snail, moon snail, sand dollar, mole crab, sand clam and razor clams are often found in these zones. These animals live in or on the sand surface. Seaweeds and seagrasses may be present in the lower intertidal and subtidal areas. Seagrasses help stabilize sands and provide food and substrate for other organisms including red fringe, skeleton shrimp, bubble snail, Dungeness crab, graceful kelp crab, green sea slug, hooded nudibranch, and shaggy mouse nudibranch. Fish that use these zones include flatfishes, staghorn sculpin, surfperches, and penpoint gunnel.

Coos Head

Coos Head has a similar sandy beach intertidal habitat as Yoakam Point.

3.1.8.2 Environmental Consequences

Potential impacts to intertidal biota of the rocky shores and exposed sandy beach habitats, including construction and operation of the proposed interpretive center and associated infrastructures, are discussed in the following sections. Although impacts from construction activities are unlikely to occur, potential temporary and permanent impacts that could result from construction activities include direct loss of habitat and water quality degradation. Potential operational impacts that could occur as a result of the proposed project include water quality degradation and trampling of intertidal biota by visitors. Operational impacts also are unlikely to be significant.

Table 14. Partial list of fishes, invertebrates, macroalgae, and other life forms of exposed sandy beach intertidal habitats

Habitat	Life Form	Scientific Name	Common Name
High Intertidal Zone			
	Invertebrates	*Orchestoidea californiana*	California beach hopper
		Orchestia traskiana	small beach hopper
		Cirolana kincaidi	water-line isopod
		Archaeomysis grebnitzkii	opossum shrimp
		Crago sp.	crago shrimp
		Eohaustorium washingonianus	hairy amphipod
		Euzonus mucronatus	bloodworm
Mid and Lower Intertidal Zones			
	Fishes	*Amphistichus rhodoterus*	redtail surfperch
		Apodichthys flavidus	penpoint gunnel
		Cymatogaster aggregata	shiner perch
		Hyperprosopon argenteum	walleye surfperch
		Lepidopsetta bilineata	rock sole
		Leptocottus armatus	staghorn sculpin
		Psettichthys melanosticus	sand sole
	Seagrasses & Seaweeds	*Phyllospadix scouleri*	surf grass
		Smithora naiadum	red fringe
	Invertebrates	*Aeolidea papillosa*	shaggy mouse nudibranch
		Cancer magister	Dungeness crab
		Cerebratulus sp.	sand nemertean
		Caprella sp.	skeleton shrimp
		Dendraster excentricus	sand dollar
		Emerita analoga	mole crab
		Glycera rugosa	proboscis worm
		Gonionemus vertens	orange jellyfish
		Haliclystus auricula	stalked jellyfish
		Haminoea virescens	bubble snail
		Leptosynapta clarki	burrowing sea cucumber
		Macoma secta	sand clam
		Melibe leonina	hooded nudibranch
		Nereis vexillosa	sand worm
		Olivella biplicata	purple olive snail
		Phllaplysia taylori	green sea slug
		Pugettia gracilis	graceful kelp crab
		Polinices lewisii	moon snail
		Siliqua patula	razor clam
		Telina bodegensis	tellen clam

Sources: USFWS, 1980; Kozloff, 1983; Snively, 1983; Brosnan and Crumrine, 1992

Direct or indirect impacts to either rocky shore or exposed sandy beach habitats and their associated aquatic biota are not likely to occur as a result of project construction at any of the proposed sites. Because no proposed construction activities (e.g., jetties, groins, or breakwaters) are within the intertidal zone, potential loss of habitat from project construction would not occur. Potential indirect impacts to intertidal biota from project construction that could occur as a result of construction activities are typically temporary impacts to water quality resulting from increased turbidity and sedimentation or spills and discharge of wash water, petroleum products, or other pollutants used during construction (e.g., concrete slurry, solvents, gasoline and diesel fuels). If water pollutants are discharged to intertidal communities, there could be shifts in community composition from pollutant-intolerant organisms to more pollutant-tolerant organisms. In addition, water pollution could contribute to changes in community structure from a diverse assemblage of flora and fauna to a community dominated by many individuals of only a few more pollutant tolerant species. These potential impacts are unlikely, however, because pollutant discharge from construction sites are located in upland areas, well away from these intertidal areas. Furthermore, potential temporary impacts to water quality resulting from construction are unlikely to be significant even in the event that pollutants reach intertidal areas because pollutants would be diluted to very low levels by large volumes of saltwater.

Operational impacts to intertidal communities from water quality degradation also are unlikely for the following reasons. Although metals, fecal coliform bacteria, nutrients, organics (e.g., petroleum hydrocarbons), and other pollutants are commonly found in untreated stormwater runoff from parking lots and other impervious surfaces, these pollutants are unlikely to be delivered to intertidal areas. Untreated stormwater runoff would not be discharged to intertidal areas, therefore, delivery of pollutants and potential impacts to intertidal biota would not occur as a result of stormwater runoff. In addition, since soils at these sites are generally unsuitable for installation of septic systems, sewage is expected to be discharge to existing conveyance systems and delivered to existing municipal wastewater treatment facilities. Therefore, it is unlikely that there could be delivery of pollutants or water quality degradation to intertidal habitats as a result of project operation.

Increased visitation could result in trampling impacts to intertidal biota of rocky shore communities at Gregory Point and Yoakam Point. In a recent study of four rocky shore areas, including Cape Arago (Gregory Point), Brosnan and Crumrine (1992) reported that some of the plants and animals in the middle and upper intertidal zones are susceptible to trampling impacts. These authors reported decreases in organisms susceptible to trampling effects (e.g., leafy seaweeds and mussels) and subsequent shifts in species composition at Cape Arago. Furthermore, this study indicated that these effects were directly proportional to the number and frequency of visitors to these intertidal communities. Greater impacts were observed at sites that were visited by more people than those that were visited less frequently. Brosnan and Crumrine (1992) recommended a monitoring program using biological indicators (i.e., loss of susceptible species including rockweeds, and the appearance of specific species of algae) to identify trampling effects.

Exposed sandy beach intertidal communities do not appear to be susceptible to trampling impacts. Therefore, comparable potential trampling impacts would not be expected to occur to exposed sandy beach communities at Bastendorff Beach.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.8.3 Mitigation Measures

Potential construction and operational impacts to intertidal biota generally would be mitigated through compliance with existing environmental regulations, including water quality standards and implementation of available pollution control technologies and best management practices. Furthermore, potential trampling impacts of intertidal biota from increased access and visitations could be mitigated by prohibiting access to the intertidal zone and public education activities.

The extent of trampling of intertidal biota is proportional to the number and frequency of visitors. Access to the rocky intertidal zones at Gregory and Yoakam Points is currently limited and would continue to be limited. The public may be directed to visit the Marine Gardens at Sunset Bay.

In addition, public education can be an effective mitigation tool. Students and visitors can be educated about the sensitivity of biota to trampling and measures used to prevent trampling through the use of interpretive signs, other displays, and guided tours. Using a combination of limiting access and public education, it is unlikely that there could be significant operational impacts to intertidal biota from the proposed project at any of these sites.

Rare, Threatened, or Endangered Species

According to the U.S. Fish and Wildlife Service (1995), there are no federally listed threatened or endangered species in the vicinity of the proposed project. There are four species, including three species of fish and one species of littorine snail that are Category 2 candidates for listing as threatened or endangered species, that may occur in the vicinity. A Category 2 candidate includes those species for which existing information suggests listing may be warranted but for which sufficient data to support a listing do not exist. The three species of fish that are candidates for listing are green sturgeon (*Acipenser medirostris*), river lamprey (*Lampetra ayresi*), and Pacific lamprey (*Lampetra tridentata*). In addition, the mollusk, Newcomb's littorine snail (*Algamorda newcombiana*) also is a candidate for listing.

These four candidate species use different habitats than the intertidal rocky shore and exposed sandy beach habitats present at Gregory Point, Yoakam Point, and Coos Head and are therefore unlikely to occur at any of these sites. Green sturgeon is a bottom dwelling or demersel fish that is generally found in bays or estuaries (Eschmeyer et al., 1983). Spawning and larval development occurs in freshwater. Juveniles and adults are generally found in subtidal areas on clean sand substrate (Emmett et al., 1991). River lamprey and Pacific lamprey are both parasitic anadromous fishes that spend most of their adult life in marine environments, returning to freshwater to spawn (Eschmeyer et al., 1983). Development of larval and later juvenile life phases of these lampreys occurs in freshwater. When in the sea, both species generally inhabit subtidal marine environments where they parasitize salmon, herring, pollock, hake, and other fishes. According to Kozloff (1983), Newcomb's littorine snail typically inhabits quiet bays and salt marshes.

3.1.9 AIR QUALITY

3.1.9.1 Affected Environment

Background Information

Air quality in the project area is regulated by the U.S. Environmental Protection Agency (EPA) and the Oregon Department of Environmental Quality (ODEQ). Under the Clean Air Act, EPA has established the National Ambient Air Quality Standards (NAAQS), which specify maximum concentrations for carbon monoxide (CO), particulate matter less than 10 micrometers in size (PM10), ozone, sulfur dioxide, lead, and nitrogen dioxide. The eight-hour CO standard of 9 parts per million (ppm) is the standard most likely to be exceeded as the result of general development projects that generate vehicular trips.

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas that reduces the oxygen-carrying capability of the blood by displacing oxygen in hemoglobin. At high concentrations, CO aggravates preexisting cardiovascular diseases, increases the risk of heart disease in healthy individuals, and can slow reflexes, weaken judgment, and impair perception. The major source of CO is vehicular traffic, along with industry, wood stoves, and slash burns. In most suburban and urban areas, motor vehicles at major intersections are the principal source of CO that cause ambient levels to exceed the NAAQS.

The effects of CO usually are localized, occurring near congested roadways and intersections during autumn and winter, and are associated with light winds and stable atmospheric conditions. CO concentrations in most areas have been decreasing over time because of more stringent federal emission standards for new vehicles and the gradual replacement of older, more polluting vehicles.

Particulate matter includes small particles of dust, soot, and organic matter suspended in the atmosphere. Particulates less than 100 micrometers in diameter are measured as Total Suspended Particulates (TSP). Particles less than 10 micrometers in size are measured as PM10, a component of TSP. The PM10 particles can be inhaled deeply into the lungs, and at high concentrations can potentially leading to respiratory diseases and cancer. Particulate matter may carry absorbed toxic substances, and the particle itself may be inherently toxic. Particulate matter can affect visibility, plant growth, and building materials. Sources of particulates include motor vehicles, industrial boilers, wood stoves, open burning, and dust from roads and construction activities. Most vehicular emissions are in the PM10-size range. High PM10 concentrations occur in fall and winter during periods of air stagnation and high use of wood for heat.

Regional

Because there are no localized air quality issues unique to any of the alternatives, the following affected environment description for the Coos Bay area applies to each site location.

Nonattainment areas are geographical regions where air pollutant concentrations exceed the NAAQS for a pollutant. The Coos Bay area is not a nonattainment area for all air pollutants including CO, ozone, and PM10.

ODEQ has established air pollution monitoring stations throughout the state of Oregon. In general, these stations are located where air quality problems have been identified. No current air quality monitoring stations exist in the Coos Bay area; the nearest stations are located in the Cities of Cottage Grove, Eugene, Grants Pass, and Roseburg all of which are over 50 miles from the project sites. Because of the local nature of most air pollutants, concentrations measured at locations more than several miles away usually are not representative of the project sites and data from these monitoring stations would not be considered relevant to this study.

Primary sources of air pollutants in the area are vehicular traffic on roadways, wood stoves in residences, slash burns, and local mill and industrial operations. Because the area is fairly rural and experiences low traffic volumes, it is unlikely that the project area experiences concentrations of CO that exceed standards. Occasional localized exceedances of PM10 standards may occur as a result of wood burning stoves although ODEQ has not documented any exceedances in the Coos Bay area.

Weather directly influences air quality. Important meteorological factors include wind speed and direction, atmospheric stability, and mixing depth. Temperature inversions, which are associated with higher air pollution concentrations, occur when warmer air overlies cooler air. Emissions from wood stoves and vehicles, which operate less efficiently during cold weather, tend to increase during temperature inversions in late fall and winter. Particulates and CO from these sources can be trapped close to the ground, which can lead to violations of the NAAQS.

The National Weather Service issues an Air Stagnation Advisory (ASA) when poor atmospheric dispersion conditions exist and are forecast to persist for 24 hours or longer. Poor atmospheric dispersion occurs when there is no mixing caused by winds and temperature changes, and can result in pollutants remaining trapped at ground level with increased concentrations. In the Eugene area, 9 ASAs were declared in 1991, none were declared in 1992 or 1993 (ODEQ, 1993). It is unlikely that stagnant conditions would persist for 24 hours in any of the proposed project areas because they are located near the coast and are usually subject to coastal winds.

Existing Land Uses

The Gregory Point site is currently used as housing for the U.S. Coast Guard and is adjacent to residential and recreational land uses. There are six residences to the north of the site, the nearest residence is 500 feet away from the existing Coast Guard facility.

The Yoakam Point site is currently used as a state park and is adjacent to residential and recreational land uses. There are three residences to the west of the site, the nearest residence is 200 feet away.

The Coos Head site is currently used as vacant forest and is adjacent to residential and military land uses. There are three residences to the south of the site, the nearest residence is 350 feet away.

3.1.9.2 Environmental Consequences

Gregory Point

Construction. Construction activities, if not properly mitigated, temporarily would generate PM10 and small amounts of CO. Fugitive dust would escape from the construction site and from soil blown from uncovered trucks carrying materials. Vehicles leaving the site would deposit mud on public streets, which would become a source of dust after it dries. CO would be emitted from construction equipment. Construction emissions would be greatest during the excavation phase because most emissions would be associated with removal of dirt from the site.

Several residences north of the project site are located within 250 feet of the potential project site. At that distance, PM10 from construction activities could be noticeable if uncontrolled depending upon tree cover, terrain, and wind conditions. Prevailing winds are typically in an westerly direction from the ocean. Mud and particulates from trucks would be noticeable where construction trucks would be routed through residential neighborhoods. Measures to reduce deposition of mud and emissions of PM10 are identified under the Mitigation Measures, Section 3.1.9.3.

In addition to PM10 emissions, heavy trucks and construction equipment powered by gasoline engines would generate CO in exhaust emissions. Emissions of CO would be temporary, limited to the immediate area surrounding the construction site, and likely would contribute a small amount compared with automobile traffic in the project area.

Some phases of construction, particularly during paving operations using asphalt, would result in short-term odors. Odors might be detectable to some people near the project site, and would be diluted as distance from the site increases.

Operational. In addition to short-term impacts from particulates during construction, operational impacts at the Gregory Point site would include long-term affects from additional or changed patterns of automobile traffic. Total vehicular emissions increase with the number of vehicles in operation. Individual vehicular emissions generally decrease with an increase in vehicle speeds and a decrease in delay times at intersections, as indicated in the level-of-service analysis. For the Gregory Point site, CO concentrations at nearby locations would change in proportion to changes in vehicular volumes. Under the worst-case scenario, traffic levels may increase up to 140% over their existing volumes (see Section 3.2.8, Access). Level of service is expected to remain at A, which is considered excellent and would be very unlikely to ever contribute to a violation of NAAQS for CO. The high level of service would be maintained and the effects on local traffic would be minimized because the majority of arriving traffic would be making a right hand turn from the highway to the site, and traffic leaving the interpretive center would not impact north or southbound travel on the highway due to the planned stop sign. Additionally, local air quality would probably benefit from stricter future federal auto emissions standards and the retirement of old vehicles being replaced with new vehicles; future concentrations of CO near the project site would most likely be less than existing conditions. No operational impacts related to implementation of the Gregory Point Alternative are expected to occur.

Yoakam Point

Construction. Because of similarities in size, facilities, and layout to the Gregory Point Alternative, construction effects at the Yoakam Point site are expected to be similar. Several residences are located within 150 feet of the project site. At that distance, PM10 from construction activities could be noticeable if uncontrolled depending upon tree cover, terrain, and wind conditions. Prevailing winds are typically in an westerly direction from the ocean. Mud and particulates from trucks would be noticeable where construction trucks would be routed through residential neighborhoods. Additionally, heavy trucks and construction equipment powered by gasoline engines would temporarily generate CO in exhaust emissions.

Some phases of construction, particularly during paving operations using asphalt, would result in short-term odors. Odors might be detectable to some people near the project site, and would be diluted as distance from the site increases.

Operational. Besides short-term impacts from particulates during construction, implementation of the project at Yoakam Point would result in long-term effects from changes in automobile traffic. CO concentrations at nearby locations would change in proportion to changes in vehicular traffic. Traffic patterns and volumes would be very similar to those at Gregory Point because both alternatives are in similar locations and feature direct access the Cape Arago Highway. There are not expected to be any operational impacts as a result of implementation of the Yoakam Point Alternative.

Coos Head

Construction. Because of similarities in size, facilities, and layout to the Gregory Point and Yoakam Point alternatives, construction activities at the Coos Head site are expected to be similar. A few residences are located less than 150 feet of the project site, (east) of the site. At that distance, PM10 from construction activities could be noticeable if uncontrolled depending upon tree cover, terrain, and wind conditions. Prevailing winds are typically in a westerly direction from the ocean. Mud and particulates from trucks would be noticeable where construction trucks would be routed through residential neighborhoods.

Heavy trucks and construction equipment powered by gasoline engines would generate CO in exhaust emissions. Emissions would be temporary and likely would contribute a small amount compared with automobile traffic in the project area.

Some phases of construction, particularly during paving operations using asphalt, would result in short-term odors. Odors might be detectable to some people near the project site, and would be diluted as distance from the site increases.

Operational. In addition to short-term impacts from particulates during construction, implementation of the project at Coos Head would result in long-term effects from additional or changed patterns of automobile traffic. CO concentrations at nearby locations would change in proportion to changes in vehicular volumes. Individual vehicular emissions generally decrease with an increase in vehicle speeds and a decrease in delay times at intersections, as indicated in the level-of-service analysis. For the Coos Head alternative, LOS is expected to remain at A, which is considered excellent and would be very unlikely to ever contribute to a violation of NAAQS for CO. Additionally, local air quality would probably benefit from stricter future federal auto emissions standards and retirement of old vehicles being replaced with new vehicles; future concentrations of CO near the project site would most likely be less than existing conditions. No operational impacts related to implementation of the Coos Head alternative are expected to occur.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.1.9.3 Mitigation Measures

All Alternatives

Oregon regulations require that reasonable precautions be taken to prevent particulate matter from becoming airborne during construction (OAR 340-21-060(2)). Construction impacts would be reduced by incorporating mitigation measures into the construction specifications for the project. Mitigation measures to control PM10, deposition of particulate matter, and emissions of CO during construction would include the following:

- Spraying exposed soil with water, to reduce emissions of PM10 and deposition of particulate matter.
- Covering all trucks transporting materials, to substantially reduce particulates blowing off trucks during transportation. Wetting materials in trucks or providing adequate freeboard (space from the top of the material to the top of the truck) would reduce PM10 and deposition of particulates during transportation.
- Providing wheel washers to remove particulate matter that would otherwise be carried offsite by vehicles, to decrease deposition of particulate matter on area roadways.
- Removing particulate matter deposited on paved, public roads, to reduce mud on area roadways.
- Requiring appropriate emission control devices on all construction equipment powered by gasoline or diesel fuel, to reduce CO emissions in vehicular exhaust. Using relatively new, well-maintained equipment would reduce CO emissions.

Mitigation measures to reduce long-term emissions of PM10 and CO would not be needed under any of the alternatives. Any mitigation measures proposed to reduce the number of vehicles, improve traffic flow, and increase vehicular speeds would reduce CO emissions.

3.2 BUILT ENVIRONMENT

3.2.1 CULTURAL RESOURCES

3.2.1.1 Affected Environment

Regional

The native peoples who lived along the Oregon coast at the time of the first explorations by Euroamericans in the 1820s practiced lifeways that were generally similar to those of coastal peoples in northern California and Washington. Collectively, these peoples are included within the southern portion of the ethnographic Northwest Coast culture area, which extended northward along the Pacific coast as far as southeast Alaska. In comparison with the native groups of British Columbia and Alaska who are widely known for their high levels of achievement in art, architecture, and ceremonial life, the cultures of the peoples of the Southern Northwest Coast are generally perceived to have been less elaborate. However, the lifeways of these southern peoples were distinctive in their own right, and their study contributes an important perspective on regional variation within the Northwest Coast culture area.

Although it is very likely that the Oregon coast was settled by at least 10,000 years before present (BP), most of the archaeological record appears to be restricted to the last few thousand years. Less than six archaeological sites investigated thus far have been reliably radiocarbon dated to earlier than 3,000 BP. The melting of continental glaciers and consequent rise in sea level between 10,000 and 5,000 BP is generally regarded as the most likely explanation for the obliteration of evidence of earlier prehistoric occupation in this region (Lyman, 1991).

Recent research indicates that subsidence of the coastal margin associated with earthquakes along the Cascadia subduction zone offshore has been another factor contributing to the limited preservation of the coastal archaeological record along the Southern Northwest Coast (Atwater et al., 1995). The best documented of these earthquakes occurred around 300 years ago, and at least six earthquakes are known to have occurred within the last 3,000 years (Darienzo and Peterson, 1995). Together, the processes of postglacial sea level rise and earthquake-induced subsidence probably account in large measure for the limited time depth so far documented for prehistoric occupation along the Southern Northwest Coast.

Isolated finds of fluted Clovis and Folsom projectile points suggest that the first inhabitants of western Oregon and Washington were Paleo-Indians (Minor, 1985). Elsewhere in North America, sites occupied by Paleo-Indians have been radiocarbon dated to between 11,500 and 10,000 BP. Aside from isolated artifact finds, no archaeological sites have yet been found in western Oregon and Washington that contain Clovis or Folsom artifact assemblages or that have been radiocarbon dated to before 10,000 BP.

The earliest radiocarbon dated evidence of occupation occurs during the Early Archaic Stage (10,000-5,500 BP). It has been suggested that the earliest inhabitants may have been "pre-littoral" or "pre-marine" cultures that did not extensively exploit the abundant mollusks, fish, birds, and mammals available in the marine environment (Ross, 1990). Lithic sites, so-called because stone tools and flakes are the only artifacts represented, have sometimes been cited as evidence of such lifeways. However, this idea is contradicted by the results of recent investigations at the extensively eroded lithic site at Indian Sands north of Gold Beach on the southern Oregon coast, where a small deflated shell scatter yielded radiocarbon dates of 7,790 ± 70 BP, 8,150 ± 120 BP, and 8,250 ± 80 BP (Moss and Erlandson, 1994). These dates, the earliest so far available from the region, indicate some human exploitation of molluscan resources at a very early time. All other radiocarbon dates so far available indicate that lithic sites are not any older than shell middens, sites that contain abundant shell deposits that are the debris from prehistoric shellfish exploitation.

The earliest substantial evidence of the exploitation of marine resources has been found at Tahkenitch Landing between Florence and Reedsport on the south-central Oregon coast (Minor and Toepel, 1986). The marine mollusks and fish found in this site's deposits indicate that an estuary was formerly present in today's freshwater Tahkenitch Lake. The Tahkenitch I component, represented by artifacts underlying a shell midden, is radiocarbon dated at 7,960 ± 90 BP and 6,680 ± 80 BP. While some fragments of marine shell are present, the primary subsistence focus was on fishing for marine species, with hunting of marine birds, harbor seal, and mule deer also indicated. This evidence supports the idea that exploitation of marine resources, though without intensive use of mollusks, has considerable time depth on the Southern Northwest Coast.

Evidence of more broadly based marine-oriented subsistence activities, reflected by sites with substantial shell midden deposits, appears during the Middle Archaic Stage (5,500 to 3,000 BP). The earliest intensive exploitation of molluscan resources occurred in the Tahkenitch II component associated with a radiocarbon date of 5,100 ± 70 BP (Minor and Toepel, 1986). Initial occupation at Yaquina Head north of Newport on the north-central Oregon coast occurred in non-shell cultural deposits radiocarbon dated at 4,100 ± 60 BP and 4,050 ± 60 BP, with the earliest shell deposits on the headland radiocarbon dated at 3,670 ± 70 BP and 3,270 ± 70 BP (Minor, 1990).

By the Late Archaic Stage (3,000-1,500 BP), sites containing evidence of intensive marine-oriented economies are present all along the Southern Northwest Coast. A number of these sites appear to represent villages. The Palmrose Site, in Seaside just south of the Columbia River on the northern Oregon coast, contains the earliest evidence of the emergence of complex cultures similar to those of the ethnographic period. A rectangular semisubterranean plank house, apparently identical to the gable-roofed house made by native peoples in historic times, has been radiocarbon dated to 2,565 ± 70 BP. This site has produced a large number of sculpted bone and antler artifacts with anthropomorphic and zoomorphic designs in the Northwest Coast art style, indicating strong ties with cultures to the north in the Gulf of Georgia/Strait of Juan de Fuca region between 2,700 and 1,700 BP (Connolly, 1992).

The Formative Stage (1,500-200 BP) reflects the full emergence of ethnographic culture patterns, characterized by large villages, ranked societies, and artistic elaboration. Formative Stage lifeways, similar to those practiced by native peoples in the early historic period, were established along the lower Columbia River by 1,500 BP (Pettigrew, 1991), and apparently along the northern California coast by 1,000 BP (Elsasser, 1978). However, at the Umpqua/Eden site west of Reedsport on the central Oregon coast, earlier Archaic-style circular houses continued to be occupied to 620 BP (Lyman, 1991), with the Formative Stage occupation appearing sometime later (Minor, 1994).

During the Protohistoric Era, a late subdivision of the Formative Stage, Asian ceramics, beeswax, and other non-native artifacts were introduced along the northern Oregon coast, apparently from shipwrecks of one or more Spanish Manila galleons between 400-300 BP (Woodward, 1986). The introduction of epidemic diseases in protohistoric times led to rapid decline in the native population, with the result that the complexity of Southern Northwest Coast societies is almost certainly underestimated in the limited ethnographic record.

At the time of the first land-based Euroamerican explorations along the southern Oregon coast in the 1820s, the Coos Indians occupied the coastline from the Coquille River on the south to Ten Mile Lake and Ten Mile Creek on the north. The Coos people spoke two languages: Hanis and Miluk. Hanis-speakers occupied all of the upper estuary, sloughs, and river systems of Coos Bay above Empire, while Miluk-speakers lived from Empire to South Slough, south along the ocean shore to the Coquille River, and up the Coquille estuary for an unknown distance (Beckham and Minor, 1980). The proposed Bal'diyaka Interpretive Center project areas are located within the territory where the Miluk language was spoken. The settlements on Gregory Point and Yoakam Point were regular points of reference in Coos ethnography and folklore.

The major themes of western history are all represented in the historical development of the southern Oregon coast (Beckham and Minor, 1980). Like other areas of the Pacific Northwest, the southern Oregon coast attracted miners, speculators, town developers, and developers of natural resources, especially the logging, lumber, ship building, and fishing industries. Lacking major land transportation routes until the twentieth century, much of southwestern Oregon settlement was oriented toward the sea. The presence of the federal government has been a consistent factor in the area's development. The U.S. Government developed harbors, constructed aids to navigation, and funded road surveys and construction; vast land areas remain under federal ownership and management.

Gregory Point

The Coos village at Gregory Point was called baldimis, meaning "ocean," or bal'diyaka, meaning "place of the oceanside people" (Beckham, 1995). The village was occupied in the early 1800s, when its inhabitants were attacked by Rogue River Indians. Only one resident survived, a woman who was away from the village at the time of the attack (Beckham, 1995). The village was apparently never reoccupied. The Coos village at Gregory Point corresponds with archaeological site 35CS11. A second archaeological site, 35CS137, was recorded during the cultural resource survey and may have been associated with the bal'diyaka village. The results of the cultural resource survey are presented in *Archaeological Investigations for the Proposed Bal'diyaka Interpretive Center, Coos County, Oregon* (Heritage Research Associates Report No. 176). This report is in the Analysis File of the project and is incorporated by reference.

The federal government has sponsored significant developments at Gregory Point (Beckham, 1995). Since 1866 a lighthouse has existed on Chief's Island, and associated buildings were constructed on both the island and adjacent mainland. From 1878-1891 the U.S. Life-Saving Service also maintained a station at Gregory Point. Although the lighthouse was placed on automatic control in the 1960s, the U.S. Coast Guard continues to house personnel in the Keeper's fourplex located on the mainland at Gregory Point. In 1975 the northwestern portion of the tip of the mainland was officially set aside as a cemetery for the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians (Beckham, 1995).

35CS11. Prehistoric archaeological site 35CS11 was recorded in 1951 as a "midden of shell and marine debris" (Collins, 1951). The area of occupation was described on the site form as "100 x 100 paces" and the depth and character of fill as "CA 4' Shell midden entirely." It was remarked that the majority of the site has been destroyed.

In 1957 C.L. Hubbs of the Scripps Institute of Oceanography conducted excavations in the shell midden deposits at 35CS11. The results of these excavations were never published, but four radiocarbon dates obtained in conjunction with this work were reported. Dates of 1,500 ± 100 BP, 2,090 ± 200 BP, and 2,120 ± 300 BP were obtained from various levels of the main midden, while a single date of 250 ± 150 BP was obtained from another area of the site (Hubbs, Bien, and Suess, 1960; 1962; 1965).

Small-scale archaeological testing took place at 35CS11 in 1977 under the sponsorship of the BLM and Oregon State University (Draper and Hartmann, 1979). One test pit (1 x 2 meters [m]) was excavated and a section of eroding midden was profiled. This test pit contained cultural deposits to a depth of 1.25 m, and the outline of a housepit was delineated in the cliff profile. Three additional test pits (1 x 2 m) were excavated. Cultural deposits extended to 40 centimeters (cm) below surface in the second test pit and to 30 cm below surface in the third test pit. The fourth test pit, excavated to a depth of 30 cm, encountered only sand from which one quartzite flake was recovered

(Draper and Hartmann, 1979). "Bone samples" recovered during this project (provenience unspecified) yielded a radiocarbon date of 1,540 ± 50 BP (Draper, 1981).

The 1995 investigations began with excavation of 26 auger holes to define the boundaries of the cultural deposits. This site was found to cover an area measuring roughly 115 m east-west by 60 m north-south. A test pit placed in the northwest area of this site contained cultural strata, including dense shell midden deposits, from approximately 15 to 100 cm below surface. A possible house floor exposed in a cutbank led to placement of a second test pit in a depression tentatively thought to represent a pithouse in the southwest area of the site. This test pit encountered cultural strata, including dense shell midden deposits, from approximately 44 to 97 cm below surface. Artifacts recovered were limited to one chert biface, one bone wedge fragment, one worked bone fragment, and one olivella shell bead.

Two radiocarbon dates were obtained in conjunction with the 1995 investigations at 35CS11. A charcoal sample from Test Pit 1, Level 9, near the bottom of the shell midden produced a radiocarbon date of 360 ± 40 BP. A charcoal sample from Test Pit 2, Level 10, in the two lower stratum of shell midden produced a radiocarbon date of 1,590 ± 50 BP.

The shell middens in both test pits were composed primarily of sea mussel (*Mytilus californianus*) and acorn barnacle (*Balanus*) fragments. Bivalves such as gaper clam (*Tresus nuttalli*), littleneck clam (*Protothaca staminea*), and cockle (*Clinocardium nuttalli*) were also observed in quantity. Also represented were sea urchin (*Strongylocentrotus purpuratus*), Black Katy chiton (*Katharina tunicata*), Giant Pacific chiton (*Cryptochiton stelleri*), butter clam (*Saxidomus nuttalli*), and crab (*Cancer* sp.).

Vertebrate faunal remains were abundant, and are dominated by fish, most of which represent rockfish (*Sebastes* sp.). Other fish include greenlings (*Hexagrammos* sp.), salmon (*Oncorhynchus* sp.), starry flounder (*Platichthys stellatus*) and other undetermined flatfish, cabezon (*Scorpaenichthys marmoratus*), Pacific staghorn sculpin (*Leptocottus armatus*) and other undetermined sculpins, hake (*Merluccius productus*), lingcod (*Ophiodon elongatus*), tomcod (*Microgadus proximus*) and undetermined surfperch (*Embiotocidae*). Identification of the few bird and mammal remains recovered has not yet been completed.

35CS137. Twenty-two auger holes excavated to determine boundaries at this newly discovered archaeological site indicate that cultural deposits cover an area measuring approximately 112 m north-south by 57 m east-west. A test pit placed in the northern portion of this site contained cultural deposits from approximately 20 to 90 cm below surface. A second test pit placed in the west-central area of the site contained cultural strata, including shell midden deposits, from approximately 10 to 60 cm below surface.

Four radiocarbon dates were obtained in conjunction with the investigations at 35CS137. Charcoal from Test Pit 1, Level 5, near the top of the shell midden produced a radiocarbon date of 1,090 ± 50 BP. Charcoal from Test Pit 1, Level 8, near the bottom of the shell midden produced a radiocarbon date of 1,200 ± 60 BP. Charcoal from Test Pit 2, Level 3, near the top of the shell midden produced a radiocarbon date of 1,160 ± 40 BP. Charcoal from Test Pit 2, Level 6, near the bottom of the shell midden produced a radiocarbon date of 1,070 ± 40 BP. Based on these results, it appears that 35CS137 was occupied for only a few hundred years between approximately 1,000 and 1,250 BP.

The shell middens in both test pits were composed primarily of sea mussel and acorn barnacle fragments. Black Katy chiton, Giant Pacific chiton, Pacific gaper (*Tresus nuttalli*), cockle, and sea urchin were also noted with some regularity. Occurring with less frequency were littleneck clam and butter clam.

Vertebrate faunal remains are dominated by herring (*Clupea harengus*), with greenling running a distant second. Rockfish, lingcod cabezon and other sculpins, surfperch, flatfish (*Pleuronectiformes*), and salmon (*Oncorhynchus* sp.) are represented in smaller numbers. The few birds and mammal remains recovered include common murre (*Uria aalge*), a small mustelid (*Mustelidae*), and unidentifiable large mammal.

Artifacts, which consist primarily of items made from bone, were relatively numerous at 35CS137. These include two harpoon points, one wedge, one needle, one awl, two worked bones, and five modified bones. Shell artifacts include four olivella beads and one disk bead. Four clay pipe fragments and one clay ball were found. The only stone item recovered is a basalt core.

Historic Archaeological Resources. The Cape Arago Lighthouse on Chief's Island at Gregory Point was listed on the National Register of Historic Places in 1992. Historical investigations for the proposed Bal'diyaka Interpretive Center identified 15 buildings or other features on the mainland at Gregory Point that were associated with the lighthouse operation (Beckham, 1995). Eight of these features are known to be at least 50 years old, generally cited as the minimum age for consideration as historical resources. These features and their approximate dates of construction are as follows: three barns (1866, 1886, 1896), a cablehouse (1892), a double garage (present by 1930), a gasoline shed (present by 1930), and two water tanks (1934). Five features less than 50 years old are known to have been constructed by the U.S. Coast Guard in 1956. Two other features, one of which is known to have been standing in 1956, are also of apparently late construction. A detailed account of the historic archaeological resources is presented in Beckham, 1995, is in the Analysis File of the project, and is hereby incorporated by reference.

Yoakam Point

Yoakam Point was known to the Coos as "Mussel Reef." The Coos settlement at Yoakam Point was known as "Mussel Reef Village, north of the lighthouse, where Miluk speaking people lived.... That was not a permanent village but a temporary mussel gathering and drying camp" (Harrington, 1942; Beckham, 1995). On the west side of Yoakam Point is a beach where the Coos gathered smelt (Don Whereat, pers. comm., 1995). Two archaeological sites, 35CS34 and 35CS129, were previously recorded at Yoakam Point. Although these two localities are not presently connected by continuous midden deposits, it appears likely that, before evident severe erosion, the two sites were part of the same large settlement known to the Coos as Mussel Reef Village.

35CS34. Site 35CS34 was recorded in 1975, at which time it was tersely described on the site form as an eroding shell midden approximately 30 meters by 60 meters. The shell midden was estimated to be approximately 30-60 cm deep. It was also noted that the "site is eroding as a result of ocean activity... There is not much that can be done to protect the site from erosion, but it could be excavated or at least tested before it is completely gone" (Ross, 1975).

Site 35CS34 was revisited in 1985, at which time shell was observed to extend for 40 m in the main area, and for 20 m in the smaller area to the southwest (Minor, 1986). It was also noted that "the midden in the main area is actively eroding and has dropped off perhaps 20 feet in the last 15 years" (Stephen Dow Beckham, pers. comm., cited in Minor, 1986). It was recommended that archaeological fieldwork should be carried out at 35CS34 within the next five years, before the research potential of this site was destroyed by erosion (Minor, 1986).

Subsequent evaluation of 35CS34 in 1994 resulted in the observation that "both site loci are severely eroding...extensive portions of the site remain, but they can only be described as heavily eroding and severely threatened" (Moss and Erlandson, 1994). A mussel shell fragment from the base of the shell midden in the north locus produced a radiocarbon date of 460 ± 70 BP. A mussel shell fragment from the base of the shell midden in the south locus produced a radiocarbon date of 520 ± 70 BP (Moss and Erlandson, 1994). Archaeological investigations were strongly recommended "in light of the site's precarious position" (Moss and Erlandson, 1994).

Archaeological investigations in 1995 began with excavation of auger holes to define the boundaries of the cultural deposits. Twenty auger holes were excavated to define the north area, which measures approximately 57 m north-south by 36 m east-west. Eleven auger holes were excavated to define the south area, which measures approximately 35 m north-south by less than 10 m east-west. Two test pits excavated in the north area contained cultural strata, including shell midden deposits, from surface to depths of 42 and 44 cm. Two test pits excavated in the south area contained cultural strata, including shell midden deposits, from surface to depths of 36 and 40 cm.

Artifacts recovered from 35CS34 were limited to three fragments from the same bone wedge, one modified bone, and two edge-modified shells. The shell midden deposits consist primarily of California sea mussel (*Mytilus californianus*) and barnacle fragments. Less common mollusks include Black Katy chiton, Giant Pacific chiton, littleneck clam, cockle, sea urchin, and an occasional purple dwarf olive (*Olivella biplicata*).

The vertebrate faunal remains recovered from 35CS34 are dominated by fish. Rockfish are the most abundant taxon, followed by herring, greenling, sculpins, and lingcod. Starry flounder, hake, salmon, and surfperch are represented in small numbers. Bird remains include gull (*Larus* sp.), cormorant (*Phalacrocorax* sp.), and scoter (*Melanitta* sp.), while mammals include elk (*Cervus elaphus*) and sea otter (*Enhydra lutris*).

35CS129. Site 35CS129, recorded in 1994, "consists of patches of shell midden...Dense shell midden appears in one small pocket. It was also noted that "this small site is in danger of total destruction due to its precarious setting" (Moss and Erlandson, 1994). Mussel shell fragments from the "densely packed shell located 30-35 cm below the surface" produced a radiocarbon date of 850 ± 60 BP (Moss and Erlandson, 1994).

Archaeological investigations at 35CS129 in 1995 included excavation of seven auger holes to determine the boundaries of the cultural deposits, and one test pit to recover a sample of the cultural and faunal materials present. Although shell pieces were observed on the surface at two localities inland from the shell midden exposed in the cliff face, none of the auger holes encountered any cultural deposits. The test pit, placed over the densest section of midden, documented that the midden was less than 15 cm thick and extended less than 60 cm inland. The test pit removed the bulk of the remaining midden, to the extent that the wall profiles show little shell.

The small volume of shell midden encountered at 35CS129 was somewhat fragmented and decomposed. The deposit was primarily California mussel and acorn barnacle. A few specimens of Black Katy chiton, Giant Pacific chiton, and Pacific gaper (*Tresus nuttalli*) were noted as well. Vertebrate faunal remains were limited to a few unidentifiable fragments of fish bone. No artifacts were recovered.

Historic Archaeological Resources. In comparison with the extensive use of Gregory Point by native peoples, no historical developments have occurred at Yoakam Point (Beckham 1995). There is, therefore, no known potential for historic archaeological resources within this project area.

Coos Head

Cultural resource investigations were not previously conducted within the Coos Head project area, and, consequently, no archaeological or historical sites were previously recorded there. The cultural resource survey was severely limited by the dense vegetation that covers most of Coos Head. The survey was supplemented by excavation of 11 auger holes, but no evidence of prehistoric or historic occupation was encountered. In view of the presence of archaeological sites on nearby headlands (e.g., Gregory Point and Yoakam Point), cultural resources may exist within the Coos Head project area, and further survey efforts are recommended after the dense vegetation has been reduced or removed. Such "post-disturbance surveys" are recognized by the Oregon State Historic Preservation Office (SHPO) as one of the more effective means of locating prehistoric and historic sites on densely-vegetated lands in the Coast Range of western Oregon (Toepel and Oetting, 1992).

No historical developments have occurred within the project area boundaries at Coos Head (Beckham, 1995). There is, therefore, no known potential for historic archaeological resources within this project area.

3.2.1.2 Environmental Consequences

As development of the proposed Bal'diyaka Interpretive Center constitutes a federal undertaking, federal regulations regarding both the definition of archaeological significance and determination of effect are applicable, including the National Historic Preservation Act (36 CFR 800), Executive Order 11593, the National Environmental Policy Act, and related statutes and amendments. The significance of archaeological resources is generally assessed in terms of the criteria for eligibility to the National Register of Historic Places. The significance of archaeological sites is usually evaluated in terms of National Register criterion (d), under which a site must "have yielded, or may be likely to yield, information important in prehistory or history" (36 CFR 60.4). This rather broad standard is generally applied to the scientific information a site may contain, as the significance of archaeological sites is directly related to the amount of information they can provide about past lifeways. The criteria for determination of effect are detailed in 36 CFR 800, "Protection of Historic Properties."

In addition to the significant resources identified for the interpretive center project, there is always the possibility that buried resources may be exposed during ground disturbance. In the event that prehistoric or historic cultural materials are encountered during earth-disturbing activities, the stipulations of 36 CFR 800.11 (Properties Discovered During Implementation of an Undertaking) should be followed. The BLM will consult with the SHPO and the appropriate tribes regarding the cultural resources found on the site.

Gregory Point

Two archaeological sites associated with Native American occupation have been recorded at Gregory Point. Although dense vegetation limited ground visibility, the results of the survey and supplemental auger testing for site discovery purposes suggest that 35CS11 and 35CS137 are the only archaeological resources associated with Native American occupation of the Gregory Point project area. Auger holes were excavated to determine the boundaries of both sites. In addition, two test pits were excavated at each site to recover samples of the cultural and faunal materials present and secure materials for radiocarbon dating. The auger hole and test pit excavations were conducted with the objective of determining the extent, nature, and significance of these two archaeological sites.

The archaeological evidence recovered during the 1995 investigations, as well as the results of previous testing at 35CS11, clearly indicate that 35CS11 and 35CS137 are both significant archaeological properties that are eligible for inclusion on the National Register of Historic Places. Both sites have been documented to consist of extensive cultural deposits that contain artifacts as well as dense accumulations of molluscan and vertebrate faunal remains. A semi-subterranean pithouse was previously documented (Draper and Hartmann, 1979), and it is likely that similar features exist at 35CS11. Although no cultural features were encountered during the limited testing, the protected setting of 35CS137 and its proximity to 35CS11 suggest that pithouses and other features may be present there as well. Considered altogether, available archaeological evidence indicates that 35CS11 and 35CS137 have the research potential to contribute to reconstruction of the lifeways of the Coos Indians over at least the last 2,000 years.

Development of the proposed interpretive center would result in direct and indirect impacts on one of the archaeological sites on Gregory Point. Direct impacts on 35CS11 would result from the development of a pedestrian trail.

Development of the proposed interpretive center would almost certainly result in substantial indirect impacts on both 35CS11 and 35CS137. Interpretive center developments would bring visitors in proximity to cultural deposits at both sites, thereby increasing the possibility of vandalism. Illicit digging for artifacts may also increase the rate of ongoing erosion. As the Gregory Point project area has long been federal property closed to the public, development of the interpretive center would introduce the public in large numbers to archaeological deposits that have been safeguarded to some extent from vandalism in the past because of restricted public access.

Most of the historical buildings or other features identified on the mainland at Gregory Point were located north of the area that would be directly affected by development of the interpretive center. For example, two concrete pads on the north tip of the mainland may correspond to the former locations of the cablehouse and gasoline shed; an asphalt-covered area may correspond with the former location of the double garage in this same vicinity. The three barns also appear to have been situated north of the impact zone.

None of the historical buildings or other features identified on the mainland represent standing structures. Although archaeological deposits may be associated with these features, none were identified during the present investigation. It remains possible but unlikely, however, that archaeological deposits may be associated with some of these features (e.g., the barns).

It is important to note that development of the interpretive center on the mainland may increase the possibility of vandalism on the historical archaeological resources associated with operation of the lighthouse on Chief's Island, which appear to meet the standards of significance under the National Register criteria.

Yoakam Point

Two archaeological sites associated with Native American occupation have been recorded at Yoakam Point. As was the case at Gregory Point, dense vegetation limited ground visibility during the cultural resource survey. Nevertheless, the results of the survey and supplemental auger testing for site discovery purposes suggest that 35CS34 and 35CS129 are the only archaeological resources associated with Native American occupation of the Yoakam Point project area.

As a means of determining the extent, nature, and significance of each archaeological site, auger holes were excavated to determine the boundaries of the cultural deposits and test pits were excavated to recover samples of the cultural and faunal materials present and to secure materials for radiocarbon dating. Two test pits were excavated in each of the two subareas of 35CS34, and one test pit was excavated at 35CS129.

The archaeological evidence recovered during these investigations clearly indicates that 35CS34 is a significant archaeological property that is eligible for inclusion on the National Register of Historic Places. 35CS34 has been documented to consist of extensive cultural deposits containing substantial accumulations of molluscan and vertebrate faunal remains as well as artifacts. This site has the potential to contribute to reconstruction of the lifeway of the Coos Indians over at least the last 500 years.

As previously noted, 35CS129 and 35CS34 were probably originally parts of the same extensive site, but have become separate localities as a result of erosion of the intervening area of Yoakam Point. Unfortunately, erosion has been so severe at 35CS129 that this site contains little potential for contributing additional significant archaeological information, beyond that obtained during the 1995 investigations. Accordingly, 35CS129 is not considered a significant archaeological property, as it does not appear to be eligible for inclusion on the National Register of Historic Places.

Development of the proposed interpretive center at Yoakam Point would apparently not result in direct impacts on 35CS34. This site does not extend into areas of proposed development. However, as at Gregory Point, the interpretive center would bring visitors in proximity to the cultural deposits at 35CS34, thereby increasing the possibility of vandalism. Illicit digging for artifacts may increase the rate of ongoing erosion. The Yoakam Point State Natural Area, administered by the Oregon Parks and Recreation Department, has long been accessible to the public but the number of visitors has never been high. As at Gregory Point, development of the interpretive center at Yoakam Point would introduce the public in large numbers to archaeological deposits that have not been generally subject to vandalism in the past.

Coos Head

No archaeological resources have been identified within the Coos Head project area. Accordingly, development of the proposed interpretive center would not affect any known archaeological sites.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.1.3 Mitigation Measures

If an adverse effect is anticipated for any of the archaeological sites determined to be significant, consultations with SHPO would be conducted to seek ways to avoid or reduce the effect on historic properties under 36 CFR 800.

Gregory Point

Two main options are available for managing potential impacts on 35CS11 and 35CS137: (1) avoidance of project impacts on the sites through implementation of protective measures, or (2) mitigation of impacts through data-recovery excavations.

The intact preservation of significant archaeological sites is clearly preferable, so that archaeological resources would be available for study in the future when "new frames of reference, methods and techniques would permit much more information to be extracted than is presently possible" (Fowler, 1982). In view of the rapid disappearance of the archaeological record due to increasing urbanization, industrialization, and other land-altering activities, it is important that efforts be made to preserve and protect significant archaeological resources whenever possible.

Protection and preservation measures at 35CS11 might include eliminating development of the pedestrian trail across the site, construction of the trail on a layer of protective fill placed over the site, fencing to prevent access to cultural deposits and/or an attempt to stabilize and cover archaeological deposits which are exposed.

At the same time, it is also recognized by the federal government that protection in place of archaeological sites is not always prudent or feasible, and that "preservation" may also take the form of information recovery through archaeological (data-recovery) excavations. In the event that preservation in place and/or protection of the archaeological resources is determined to not be feasible, further archaeological investigations designed in consultation with the BLM, the tribes, SHPO, and the Advisory Council to mitigate project-related impacts should be undertaken at 35CS11, after which development could be allowed to proceed.

Potential impacts on historical features at Gregory Point should also be avoided. In some cases, impact mitigation may be limited to mapping of the resource's location for future interpretive purposes. In the event that archaeological deposits are found to be associated with historical features, archaeological (data-recovery) excavations may be required to recover information related to historical resources.

Yoakam Point

As at Gregory Point, management options for 35CS34 include (1) avoidance of project impacts and implementation of protective measures, or (2) mitigation of impacts through data-recovery excavations. As project-related impacts mainly derive from increased access by the public, protection and preservation measures may include fencing to prevent access to cultural deposits and/or an attempt to stabilize and cover archaeological deposits.

Project-related impacts on 35CS34 might also be mitigated through archaeological (data-recovery) excavations, after which development would be allowed to proceed. As 35CS34 is on Oregon State land, any proposed archaeological investigations would require a permit from the State of Oregon under ORS 390.235. A formal research design, outlining the intent and scope of the proposed investigations, is required along with the permit application. The permit application and research design must be approved by both SHPO and appropriate Native American tribes before a permit for archaeological excavations may be issued.

Coos Head

As no archaeological resources have yet been identified, no mitigation measures are known to be required in connection with development of the interpretive center at Coos Head. In the event that archaeological resources are discovered, they must be evaluated following procedures and criteria established by the National Historic Preservation Act of 1986 and the Advisory Council on Historic Preservation regulations (35 CFR 800). Any archaeological investigations should be carried out in consultation with the appropriate Native American tribes.

3.2.2 PALEONTOLOGICAL RESOURCES

3.2.2.1 Affected Environment

Regional

The Eocene sedimentary bedrock underlying the three proposed subject sites are all fossiliferous. The megafossil (visible to the naked eye) assemblages are generally invertebrate species consistent with near shore paleoenvironments. A distinctive fossil of the area is the clam (*Pachydesma aragoensis*), which is considered unique since it has retained some of it's brown and black shell markings.

The megafossil assemblages are described by many early geologists. The primary paleontological studies for the area are:

- Description of the Coos Bay Quadrangle, U.S. Geological Survey (USGS) Geology Atlas 73 Coos Bay Folio (1901), Joseph S. Diller.
- The Miocene of Astoria and Coos Bay, Oregon, USGS Professional Paper 59 (1909), William H. Dall.
- Stratigraphy and Mollusca of the Eocene of Western Oregon, Geological Society of America (GSA) Special Paper 10 (1938), F.E. Turner.

- Paleontology of the Marine Tertiary Formations of Oregon and Washington, Washington University Publications in Geology (WUPG) Volume 5 (1942).
- Stratigraphy and Paleontology of the Tertiary Formations at Coos Bay, Oregon, WUPG Volume 6 (1949), Charles E. Weaver.

Microfossils are also plentiful and generally confined to the finer grained deposits. Studies on foraminifera were completed by Detling in 1946, Cushman, Stewart and Stewart in 1947, and Stewart in 1957. In addition, plant seeds, pollen, and seeds were examined by Hopkins and reported in 1967. Leaf imprints have been occasionally found in the coal beds, however, the vegetation features are generally obliterated during the process of coal formation.

Gregory Point

The Lower Coaledo Formation underlying Gregory Point is very fossiliferous. The dominant megafossils are molluscan species of Late Eocene age, predominantly pelecypods (clams) and scaphapods (tooth shells). In addition, crabs and shark's teeth may also be locally prevalent. Concretions found throughout the sandstone layers reportedly may contain the fossil remains of echinoderms such as sand dollars or starfish (Steere, 1955). Additional paleontological evidence of marine life in the form of trace fossils, such as bioturbation holes, were observed in the rocks.

Yoakam Point

A small coal bed was observed in the sea cliff at Yoakam Point. In addition, in close stratigraphic proximity to the coal bed were two thin layers of a coquina made up of small pelecypod shells. Similar fossil assemblages as described for Gregory Point can be observed in the rocks of Yoakam Point. Other fossil assemblages were observed during the site study, including a cluster of crab carapaces.

Coos Head

The younger fossil assemblages of the Tunnel Point sandstones are sparser than those of the Coaledo Formations. The fossil assemblages generally consist of clams and are confined to the basal portion of the formation. Due to the structural inclination of the Tunnel Point Formation, the basal portion of the rocks is exposed on the western slope of the promontory.

3.2.2.2 Environmental Consequences

Regional

Under current interpretation of existing federal laws, paleontological resources are protected under the Federal Antiquities Law of 1906. This law specifically prohibits the disturbance of objects that can be classified as ancient and that are on federal land.

The law also establishes criminal sanctions for violations. The Federal Highways Act of 1958 specifically extended the Federal Antiquities Act of 1906 to protect paleontological assemblages. The National Environmental Protection Act of 1969 (NEPA) provided further protection by stating that construction projects "shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains..." This law has been generally applied to vertebrate fossil localities, but can be extended to sites with invertebrate fossils.

The State of Oregon has it's own specific regulations concerning paleontological resources, specifically ORS 273.705 and OAR 660-1 to -40. These rules specifically state that "paleontological features" must be protected.

Since the construction of the Bal'diyaka Interpretive Center is not expected to extend to bedrock, no impact on the fossil assemblages are expected.

The fossil exposures at the three proposed sites are generally found on the steep perimeter slopes. The uncontrolled collection of fossils from exposures along the steep perimeter slopes by site visitors and construction workers would accelerate the rates of erosion.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.2.3 Mitigation Measures

Regional

The Society of Vertebrate Paleontology has prepared guidelines for mitigating the adverse impacts of construction projects on paleontological resources. The use of a mitigation plan would reduce the adverse impacts on paleontological resources.

Fossil collecting by private individuals can be controlled. Public interest is served by preserving the collected fossils and presenting them in museums. Other specific controls may include the following:

- Requirements of permits;
- Restriction to supervised educational activities; and/or
- Restriction to selected areas.

3.2.3 SOCIAL AND ECONOMIC VALUES

3.2.3.1 Affected Environment

Regional

Population. The population of Coos County and its communities has been essentially static since 1980, declining an average of 0.1% per year between 1980 and 1994 (see Table 15). Oregon population, in comparison, has increased by an average of 1.1% per year during this period. Among the larger communities in Coos County, Coos Bay has experienced some growth, averaging 0.5% per year over this period, most of which has occurred since 1991. North Bend has experienced no population change, and population in the unincorporated portions of the county has declined an average of 0.4% per year.

Table 15. Coos County Population 1980-1994

Year	Coos Bay	North Bend	Other Areas	Coos County	Oregon
1980	14,424	9,779	39,844	64,047	2,633,156
1982	13,710	9,320	38,720	61,750	2,656,185
1984	14,770	9,110	37,120	61,000	2,660,000
1986	14,330	8,770	34,400	57,500	2,661,500
1988	14,220	8,850	35,730	58,800	2,791,000
1990	15,076	9,614	35,583	60,273	2,842,321
1991	15,065	9,730	36,405	61,200	2,930,000
1992	15,150	9,760	37,190	62,100	2,979,000
1993	15,170	9,800	37,530	62,500	3,038,000
1994	15,450	9,840	37,510	62,800	3,082,000
Av. Ann. Growth	0.5%	0.0%	-0.4%	-0.1%	1.1%
Percent of County	24.6%	15.7%	59.7%	100.0%	NA

Source: Center for Population Research and Census, 1995

Coos County has an aging population with 18% age 65 or over. This compares to 14% for Oregon overall. Retirees are prevalent among the newer residents of the county and appear to be an important component of the recent population growth.

Table 16. Coos County Population Age Distribution, 1993

	0-14	15-34	35-65	65 and up	Total	% of OR
Coos County	12,952	15,321	23,082	11,145	62,500	2.1%
Percent	21%	25%	37%	18%	100.0%	
Oregon	659,811	855,932	1,105,652	416,605	3,038,000	NA
Percent	22%	28%	36%	14%	100.0%	

Source: Center for Population Research and Census, 1995.

Coos County residents lag in educational attainment compared to Oregon overall, with 12.3% attaining a college degree compared to 20.6% for the state.

Table 17. Coos County Educational Attainment, 1990

	Coos County	Oregon
Elementary	7.8%	6.2%
Some High School	16.7%	12.3%
High School Graduate	32.7%	28.9%
Some College	23.5%	25.0%
Associate Degree	7.0%	6.9%
College Graduate	12.3%	20.6%
Total	100.0%	100.0%

Source: Oregon Housing and Community Service Department, 1993.

Employment. Lumber and wood products is a significant portion of Coos County employment, representing 9% of all jobs in the county for 1993. This compares to 4.1% for Oregon overall, indicating the continuing importance of this industry in the county. Retail trade and service provide the greatest number of jobs, with a total of

39.9% between the two categories. A portion of these jobs relate to the county's tourism and recreation industry.

Table 18. Coos County 1993 Covered Employment

	Average Employment	Percent
Government	4,755	24.1%
Retail Trade	4,584	23.2%
Services	3,304	16.7%
Manufacturing	3,126	15.8%
Lumber and Wood Products	1,782	9.0%
Other Manufacturing	1,344	6.8%
Other	3,999	20.2%
Total Employment	19,768	100.0%

Source: Oregon Employment Department, 1994.

According to Dean Runyan Associates (1993) a total of 1,149 jobs in the county are attributable to travel and tourism, as appears in Table 19.

Table 19. Travel Impacts in Coos County by Type of Business, 1993

	Travel Expenditures ($000)	Payroll ($000)	Employment (Jobs)
Accommodations	12,063	2,667	322
Eating, Drinking	15,919	3,886	510
Food Stores	6,948	709	45
Air Transportation	413	123	7
Ground Transportation	9,755	561	55

Recreation	5,632	1,399	104
Retail Sales	13,191	1,365	106
County Total	63,920	10,711	1,149

Source: *Dean Runyan Associates, 1994.*

A substantial portion of Coos County employment is in small firms. According to the data in Table 20, 27.9% of Coos County employment is in firms with nine or fewer employees, compared to 19.1% for Oregon overall. Some larger firms also are important, with a total of 15.8% of employees working for firms of between 100 and 249 employees. There are no firms in the county with 250 or more employees.

Table 20. Coos County Employment by Size of Firm (Private Industry Only)

Size of Firm	Coos County	% of County	Oregon	% of State
0-4 employees	1,714	11.7%	84,638	8.2%
5-9 employees	2,375	16.2%	113,286	10.9%
10-19 employees	2,652	18.1%	143,887	13.9%
20-49 employees	3,599	24.6%	207,412	20.0%
50-99 employees	1,997	13.6%	142,310	13.7%
100-249 employees	2,321	15.8%	151,709	14.6%
250-499 employees	0	0.0%	79,576	7.7%
>499 employees	0	0.0%	113,832	11.0%

Source: *Oregon Employment Department, 1994.*

Income. Median household income in Coos County was $22,146 in 1989, compared to $27,250 for Oregon overall (see Table 21). In Coos County, 42.2% had incomes of less than $20,000 per year, compared to 35.6% for the state. Per capita income data for 1994 and previous years show a similar pattern, with Coos County lagging the state by a substantial amount.

Table 21. Coos County Household Income, 1989

Income	Coos County	Oregon
Under $10,000	20.3%	15.3%
$10,000-19,999	24.9%	20.3%
$20,000-34,999	19.5%	27.6%
$35,000-49,999	24.1%	18.1%
$50,000 or more	11.4%	18.8%
Median Household Income	$22,146	$27,250

Source: Oregon Housing and Community Service Department, 1993.

Unemployment. Unemployment in Coos County has consistently exceeded that in Oregon for a number of years. In 1994, Coos County unemployment averaged 8.3%, compared to 5.4% for Oregon. Unemployment in the county has declined over the past several years, however, from 10.9% in 1992; it now stands near a 15-year low. According to Employment Security Labor Market Information records for Coos County for March 1995, maintained by the Oregon Employment Department, a total of 1,219 people have left jobs in the area and are available for work.

Table 22. Coos County Civilian Unemployment Rates

Year	Coos County	Oregon	U.S.
1980	13.8%	8.3%	7.1%
1981	15.7%	9.9%	7.6%
1982	14.3%	11.6%	9.7%
1983	14.5%	10.8%	9.6%
1984	14.4%	9.4%	7.5%
1985	13.2%	8.8%	7.2%
1986	10.6%	8.5%	7.0%
1987	8.2%	6.2%	6.2%

1988	9.2%	5.8%	5.5%
1989	9.8%	5.7%	5.3%
1990	8.3%	5.5%	5.5%
1991	8.8%	6.0%	6.7%
1992	10.9%	7.5%	6.5%
1993	10.4%	7.2%	6.0%
1994	8.3%	5.4%	NA

Source: *Oregon Employment Department, 1995 and Oregon Housing and Community Service Department, 1993.*

Many of those looking for work in Coos County have previous work history in the retail or service sectors and are relatively young (under age 35). For example, those who worked in wholesale and retail trade, total 256 people; another 232 worked in services. Among those looking for work are 81 who previously worked in eating and drinking establishments and 22 in lodging establishments. In addition, a total of 113 individuals who are in the construction trades, are looking for work. Of those looking for work, 441 are under the age of 35 and 98 are under the age of 24.

These findings indicate that a substantial number of individuals in the county are looking for work in the retail and service sectors, which are typical for the visitor industry. In addition, people in the construction trades are available for work.

Among tribal members, 185 of whom live in Coos County, between 18% and 19% are unemployed, according to the most recent data available to tribal staff. In addition, there are tribal members who live elsewhere in Oregon and the Northwest who are interested in returning to Coos County if employment were available.

Of those unemployed in Coos County, a substantial portion are young (under 30) and with limited skills and work experience.

Gregory Point, Yoakam Point, and Coos Head

All social and economic aspects of the affected environment affect the sites equally and are discussed above.

3.2.3.2 Environmental Consequences

Gregory Point

Attendance Projections. Projected attendance for the facility for the year 2000, assuming the full buildout described in the Master Plan, amounts to 266,084 people, broken out as appears in Table 23. These projections are from the demand analysis included in the project Master Plan and are based in part on the following assumptions:

- Attendance of 200 visitors each year per 1,000 Coos County residents (representing an average of one visit every five years for each resident);
- Attendance of 25 visitors each year per 1,000 Oregon residents from outside Coos County;
- Attendance from outside Oregon representing 65% of total attendance; and
- School group attendance of 4,000 people per year.

Table 23. Attendance Projection

Projection Factor	Amount
Penetration rate:	
Coos County	200
Oregon	25
Percent non-resident Oregon	65%
School group attendance	4,000
Non-school attendance:	
Coos County	13,460
Oregon	78,269
Out-of-state	170,354
Total	266,084

Note: Coos County Year 2000 population of 67,300, Oregon Population of 3,198,070.

Source: SMH Architecture, 1992.

These capture rates are consistent with those for other well-established facilities in Oregon and, accordingly, would be achieved after the facility is fully developed, assuming it is well-operated and competently marketed. The data from which capture rates, out-of-state attendance and other factors are derived appear in the Master Plan document (SMH Architecture, 1992).

Impacts

Construction Phase Impacts. Construction of the facility is expected to require two years and involve a total budget of $19.8 million, $16.1 million of which would be for construction expenses. These amounts are from the Master Plan document ($18.3 million and $14.9 million, respectively), adjusted for inflation using the Western Region Consumer Price Index (CPI). Of the construction amount, an estimated 45% would be for payroll, representing $7.2 million. Based on data for Coos County from the Oregon Employment Department, the average annual income per construction employee in 1993 (the most recent year for which these data are available) was $23,500. Adjusting this amount to represent 1995 by using the CPI yields an average annual payroll per construction employee of $24,640. This average includes all full-time and part-time jobs in the county.

Assuming the construction budget is spread over two years and the entire amount accrues to employees within Coos County, these expenditures would result in a total of 146 construction jobs, including both full- and part-time positions. Construction employment would be less than this amount depending on the extent to which construction contracts are awarded to firms located outside Coos County.

Ongoing Direct Impacts

On-Site Impacts. On-site impacts consist of payroll, employment, and purchases of goods and services that are associated directly with the operation of the proposed facility. The completed facility is expected to be operated by a staff of 15 people and to generate an annual payroll of $341,000, as appears in Table 24. Including fringe of 25%, annual staff costs would amount to $426,000. This staffing plan and budget is very preliminary and would be adjusted as the facility concept is refined further.

Table 24. Projected Operating Staff

Position	Number Staff	Average Salary	Staff Budget
Director	1	45,000	45,000
Administrative assistant	1	24,000	24,000
Collections manager	1	32,000	32,000
Interpretive specialists	5	24,000	96,000
Maintenance manager	1	24,000	24,000
Volunteer coordinator	1	24,000	24,000

Sales manager	1	24,000	24,000
Sales staff	4	18,000	72,000
Total	15	NA	341,000

Source: *Dean Runyan Associates, 1995.*

In addition, it is estimated that a total of $81,000 per year would be expended by the facility for office supplies, maintenance materials, and other goods and services in the local community. This amount is comparable to the budget proportion of operating expenditures for these items by the Columbia River Maritime Museum in Astoria, Oregon, a well-established facility of comparable size for which budget data are available. This amount assumes that Coos County merchants can capture 50% of all expenditures of this type.

Off-site Impacts. Economic benefits would accrue throughout Coos County that are attributable to the proposed facility to the extent that it draws visitors to the County and/or retains visitors longer than they otherwise would have stayed. These benefits accrue to local businesses that sell products and services to visitors, in particular lodging, food, transportation and recreation services, and retail goods.

The total expenditures each year that would be attributable to the proposed facility, amounting to about $4.6 million in sales, are shown in Table 25.

Table 25. Projected Visitor Expenditures Attributable to Proposed Facility

Traveler Accommodation	Proportion of Visitors (1)	Visitors/ Yr (2)	Average Party Size (3)	Average Expenditures ($/Party/Day) (4)	Attributable to Facility (5)	Direct Expenditures ($000/yr) (6)
Hotel/Motel/B&B	24%	59,421	2.8	213	42%	1,899
Friends/Relatives	13%	31,824	2.5	104	42%	556
Campgrounds	13%	31,824	3.2	109	42%	455
Day Visitors	50%	124,312	3.0	95	42%	1,653
All Visitors	100%	248,624				4,563

Source: *Dean Runyan Associates, 1995. Visitor Characteristics Data from Dean Runyan Associates, 1989.*

Calculations in Table 25 are as follows:

Factor	Column	Source/Calculation
Proportion of visitors	(1)	From the most recent data on travelers to and through Coos County, provided by the Oregon Tourism Division
Visitors per year	(2)	Total projected facility attendance -- excluding adult and youth attendance by Coos County residents -- is distributed using the percentages in (1)
Average party size	(3)	From the most recent data on travelers to and through Coos County, provided by the Oregon Tourism Division
Average expenditures	(4)	From the most recent data on travelers to and through Coos County, based on Dean Runyan Associates data
Attributable to facility	(5)	The proportion of expenditures attributable to the facility assuming that 15% of visitors are bound solely to the facility, 50% visit two or three sites during the day, and 35% visit five sites during the day. The weighted average of these amounts is 42%.
Direct expenditures	(6)	Expenditures in the community that are attributable to the proposed facility.

This total expenditure amount is allocated to business categories using expenditure distributions for day visitors and for each type of overnight visitor according to their primary lodging. These distributions are from the most recent data on visitors to Southwest Oregon, obtained from the Oregon Tourism Division. These calculations appear in Table 26. Day visitors and overnight visitors are treated separately; overnight visitors include those staying in commercial lodging, campers, and the homes of friends or relatives. These findings indicate that the largest visitor expenditures are in retail establishments, including food stores ($1.6 million), and in eating and drinking establishments ($1.2 million).

Table 26. Projected Visitor Expenditures by Type of Visitor

Annual Visitor Expenditures ($000/yr)						
Business Category	Overnight Visitors Amount	Overnight Visitors Percent	Day Visitors Amount	Day Visitors Percent	Total Visitors Amount	Total Visitors Percent
Accommodations	584	20.1%	0	0.0%	584	12.8%
Food/beverage	736	25.3%	470	28.4%	1,206	26.4%
Transportation	426	14.6%	331	20.0%	757	16.6%
Recreation	250	8.6%	179	10.8%	429	9.4%
Retail	913	31.4%	675	40.8%	1,588	34.8%
Total	2,910	100.0%	1,653	100.0%	4,563	100.0%

Source: Dean Runyan Associates, 1995.

The payroll and employment attributable to these expenditures are calculated using the relationships between business sales and payroll, and between payroll and employment for each category of visitor industry business in Coos County, as shown in Table 27. For example, the findings indicate that lodging businesses earn $584,000 per year, provide a payroll of $129,000 per year, and employ an average of 15.2 people that are attributable to the sales associated with the proposed facility. Total payroll attributable to the facility amounts to $744,000, supporting average annual employment of about 77 people. This amount represents somewhat under 0.4% of all employment in Coos County.

Table 27. Expenditures, Payroll and Employment Attributable to Proposed Facility (1995 dollars)

Business Category	Expenditures ($000/yr)	Payroll ($000/yr)	Employment
Accommodations	584	129	15.2
Food/beverage	1,206	294	37.8
Transportation	757	51	4.5

Recreation	429	107	7.7
Retail	1,588	163	11.6
Total	4,563	744	76.9

Source: *Dean Runyan Associates, 1995.*

The largest portion of the employment that is attributable to the proposed facility is in food and beverage businesses (38 jobs) and retail establishments (12 jobs). Many of these jobs would be available to those who are young and have limited job experience; individuals of this type constitute a substantial portion of those who are unemployed in Coos County.

Revenue would accrue to the local jurisdictions within Coos County from lodging taxes levied on hotels, motels, bed and breakfasts, and commercial campgrounds. On the basis of the accommodations expenditures from Table 27, and assuming that the relationship between lodging sales and lodging tax receipts remains the same as in 1993, lodging tax receipts would total $27,100 per year.

Indirect Impacts. A means of estimating indirect sales and employment impacts in Coos County is through using an analysis prepared in 1991 as part of the planning for the Oregon Dunes National Recreation Area. This analysis included preparing an economic model (based on the IMPLAN input/output model methodology prepared by the U.S. Forest Service) for the Coos, Douglas, and Lane County area. This is the most recent and pertinent information available for this location.

Output and employment multipliers were estimated at 1.73 and 1.82, where these are Type III multipliers that include the effects of household spending associated with the primary employment and proprietor income impacts. These multipliers, therefore, include all economic effects generated by the primary impacts: the expenditures of businesses and agencies that earn money from visitors as they spend for goods and services necessary to run their operations, plus the effects generated by households as they make purchases using the wages and proprietor income they receive.

Based on a projection of annual off-site expenditures by visitors that are attributable to the proposed facility and amount to $4.56 million, total expenditures would amount to $7.9 million.

A summary of direct and total employment impacts, based on these figures, is as follows:

Table 28. Summary of Direct and Total Employment Impacts

	Direct Impact		Total Impact	
Impact Category	**Payroll**	**Employment**	**Payroll**	**Employment**
Construction	$3.6 million	146	$6.6 million	266
Annual:				
On-site	$341,000	15	$621,000	27
Off-site	$774,000	77	$1,409,000	140
Total	$1,115,000	92	$2,030,000	167

Source: Dean Runyan Associates, 1995.

Yoakam Point and Coos Head

Environmental consequences for these sites are the same as those for Gregory Point and are discussed in the section immediately above.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.3.3 Mitigation Measures

Business sales, employment, payroll, and tax receipts are among the benefits for which the facility would be built and, accordingly, no mitigation measures are necessary. Measures that would serve to enhance these benefits include:

- Ensure, to the greatest extent possible, that employment and contracting opportunities are made available to local area residents, in particular those who are currently unemployed; this includes both construction-phase and ongoing opportunities;

- Work with job training programs to assist Coos County residents with any retraining necessary for responding to new employment opportunities; and

- Provide small business startup assistance for those Coos County residents who recognize and wish to respond to new business opportunities related to an expanding visitor industry.

3.2.4 LAND USE

3.2.4.1 Affected Environment

Regional

Land Use. Land use in the project area is characteristic of the Oregon coastal shoreland environment. Primarily undeveloped or used for recreation, land uses in the project area also include federal government facilities, privately-owned residences, and a small agricultural area.

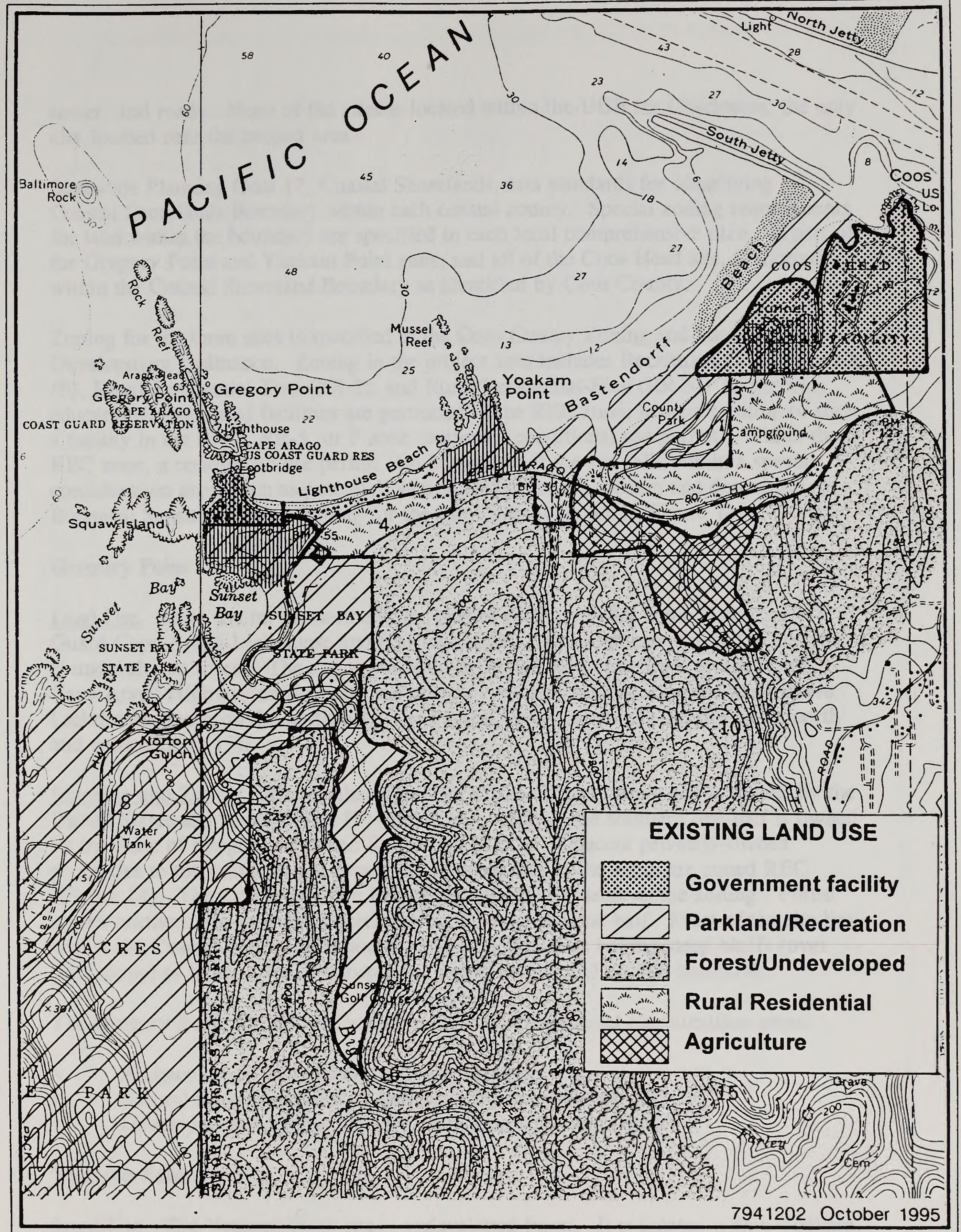
South and west of Gregory Point, the southernmost site, are three State Parks -- Cape Arago, Sunset Bay, and Shore Acres. Between Gregory Point and Yoakam Point are approximately 35 privately-owned residences located on the bluff above Lighthouse Beach and along the south side of Cape Arago Highway. Undeveloped forest land is the dominant land use south and east of both these sites. Between Yoakam Point and Coos Head is Bastendorff Beach County Park, with several privately-owned residences and a recreational vehicle park located further to the south. A small agricultural area along Miner Creek is located south of Cape Arago Highway between these two sites. The town of Charleston, location of a U.S. Coast Guard Station and the Oregon Institute of Marine Biology (a University of Oregon facility), is east of the project area. Existing land uses in the project area are illustrated in Figure 13.

Regional

Planning and Zoning. Planning and zoning in the project area is regulated through the following plans and ordinances:

- Oregon's Coastal Management Program, approved by the U.S. Department of Commerce, including:
    - 19 Statewide Planning Goals, adopted by the Oregon Land Conservation and Development Commission (LCDC);
    - Local plans and policies, approved by LCDC, including:
        - Coos County Comprehensive Plan;
        - Coos County Zoning and Land Development, and Ordinance Code; and
    - Other State laws and plans, such as:
        - Master Plan for Sunset Bay District Parks.

Statewide Planning Goal 14, Urbanization, sets standards for identifying an urban growth boundary (UGB) for each city in the state. The UGB divides urban from rural land, as well as sets limits for extension of urban facilities and services, such as water,



Land use in the area of three alternative sites for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE
13

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sewer, and roads. None of the sites is located within the UGB for Charleston, the only city located near the project area.

Statewide Planning Goal 17, Coastal Shorelands, sets standards for identifying a Coastal Shorelands Boundary within each coastal county. Special zoning requirements for land within the boundary are specified in each local comprehensive plan. A part of the Gregory Point and Yoakam Point sites, and all of the Coos Head site, is located within the Coastal Shoreland Boundary as identified by Coos County.

Zoning for the three sites is specified in the Coos County Zoning and Land Development Ordinance. Zoning in the project area includes Recreation (REC), Forest (F), Rural Residential-Two (RR-2), and Rural Residential-Five (RR-5). In general, educational-associated facilities are permitted in the REC zone; however, siting of such a facility in the RR-2, RR-5, or F zone requires a conditional use permit. Within the REC zone, a conditional use permit also is required if the site falls within a special consideration area, such as potential Natural Hazard beach erosion and deposition, or Botanical Sensitive Area. Zoning for the three sites is shown in Figure 14.

Gregory Point

Land Use. Land use on the northern one-half of Gregory Point is the U.S. Coast Guard Cape Arago Lighthouse and housing facility. The southern one-half of the site is undeveloped forest. The site is bordered by Sunset Bay State Park on the south, Cape Arago Highway on the east, and privately-owned residences on the bluff above Lighthouse Beach on the northeast. The Pacific Ocean surrounds the site on its north and west (Figure 13).

Planning and Zoning. The northern one-half of the Gregory Point site is owned by the United States and zoned Forest (F) with farm overlay. The southern one-half is owned by the State of Oregon and zoned Recreation (REC). Adjacent privately-owned properties to the northeast are zoned RR-2; properties to the south are zoned REC (Figure 14). The Comprehensive Plan designation is the same as the zoning - Forest on the northern one-half and Recreation on the southern one-half. Most of the site lies within the Coastal Shoreland Boundary and is identified as having steep bluffs (over 30% slope) or being areas of exceptional scenic quality and coastal headlands.

The Gregory Point site also is located in the following special consideration areas:

- Archaeological and Historical Sensitive Area;
- Natural hazards removal of headlands by ocean waves; and
- Development Potential within Ocean Shorelands and Dunes.

Yoakam Point

Land Use. The Yoakam Point site is undeveloped forest. It is located within Yoakam Point State Park, which has undeveloped trails and unimproved parking. The site is

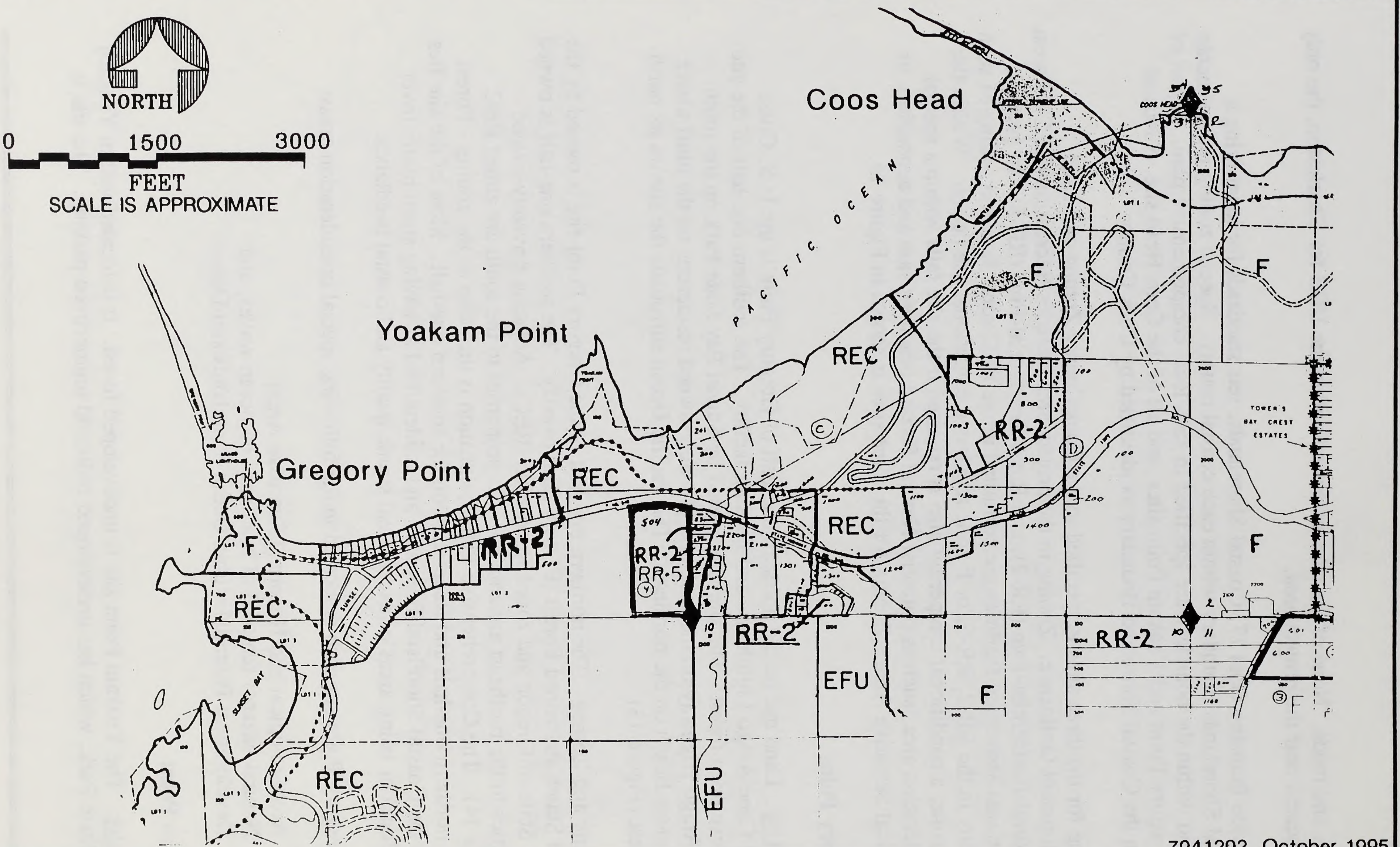

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FIGURE 14

Coos County zoning designations in the area of three alternative sites for the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

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bordered by privately-owned residences on the west, Cape Arago Highway on the south, and Bastendorff Beach County Park on the east. The Pacific Ocean borders the site on its north side (Figure 13).

Planning and Zoning. The Yoakam Point site is owned by the State of Oregon and zoned Recreation (REC).

Adjacent privately-owned properties to the west are zoned RR-2, properties to the south across Cape Arago Highway are zoned RR-2, RR-5, and REC, and Bastendorff Beach County Park to the east is zoned REC (Figure 14). The Comprehensive Plan designation for the Yoakam Point site is the same as the zoning - Recreation. Most of the site lies within the Coastal Shoreland Boundary and is identified as having steep bluffs (over 30% slope) or being areas of exceptional scenic quality and coastal headlands.

The Yoakam Point site also is located in the following special consideration areas:

- Botanical Sensitive Area;
- Natural hazards removal of headlands by ocean waves; and
- Development Potential within Ocean Shorelands and Dunes.

In addition, the Master Plan for Sunset Bay District Parks (Oregon Parks, 1986) identifies Primary, Secondary, and Limited Protection Areas on the site. Primary Protection Areas are designated on the point itself, Secondary Protection Areas are on the upland marine terrace, and Limited Development Areas are on the flat area adjacent to Cape Arago Highway. The Master Plan states that the Yoakam Point site is not suitable for development without major changes.

Coos Head

Land Use. The Coos Head site is undeveloped forest. Located within the Coos Head U.S. Naval Facility, the site is bordered by Tunnel Point Lane and four privately-owned residences on the south, the U.S. Naval Facility buildings and an access road on the east, and Bastendorff Beach and the Pacific Ocean on the north and west. Bastendorff Beach County Park is farther to the southwest (Figure 13). In general, land use in the area around the Coos Head site is more developed than at the Gregory Point and Yoakam Point sites.

Planning and Zoning. The Coos Head site is owned by the U.S. Coast Guard and is zoned Forest (F), as is the rest of the Coos Head U.S. Naval Facility.

Adjacent, privately-owned property to the south along Tunnel Point Lane is zoned RR-2, and Bastendorff Beach County Park to the west is zoned REC (Figure 14). The Comprehensive Plan designation for the Coos Head site is the same as the zoning - Forest. The site lies within the Coastal Shoreland Boundary, with the northern one-half of the site identified as being areas of exceptional scenic quality and coastal headlands.

The Coos Head site also is located in following special consideration areas:

- Beaches and dunes limited and not suitable development areas;
- Natural hazards beach erosion and deposition; and
- Development potential within ocean shorelands and dunes.

The Development Potential Within Ocean Shorelands and Dunes identifies the Coos Head site as either limited or not suitable for residential, commercial, or other development (Kerns, pers. comm., 1995). Development would be allowed in the limited areas subject to a conditional use permit; however, development would not be permitted in the not suitable areas unless a geological report proves the site is suitable (Evernden, pers. comm., 1995).

Although the Coos Head site is within the Coos Bay Estuary Management Plan (CBEMP), Coos Bay and the South Jetty, located north of the Coos Head site, are located within policy segments 68B-WD and 68A-CS of the plan.

3.2.4.2 Environmental Consequences

Gregory Point

Land Use. The proposed interpretive center would be built in the approximate location of existing U.S. Coast Guard housing on the Gregory Point site, with parking located in the central part of the site (see Figure 2). The existing Cape Arago Lighthouse would remain and would be integrated into the design. A proposed recreated Indian village would be built to the west of the center in an area that currently is undeveloped forest. Trails would connect the interpretive center to Sunset Bay State Park, and provide public access to views of Cape Arago Lighthouse, as well as wind through the remainder of the site. Access to the site would be from Cape Arago Highway, southwest of Lighthouse Way.

The proposal would be consistent with adjacent recreational and residential land uses. Although more of the site would be used and the size of the interpretive center is larger than the existing U.S. Coast Guard housing, most of the facilities would not be visible from adjacent areas or the highway because of buffering provided by heavy forest cover on the site. U.S. Coast Guard facilities and activities on Gregory Point already are part of the landscape for residents to the northeast, along the bluff above Lighthouse Beach; therefore, a change in use to an interpretive center would not be significant. The nearest residences along Lighthouse Way would be separated from the nearest roadway by a buffer of at least 100 feet and from the interpretive center by at least 500 feet (see Figure 2). In addition, Lighthouse Way would not be used to access the site because the main entrance would be on Cape Arago Highway.

Use of Sunset Beach State Park by visitors to the Gregory Point site likely would increase because access to the beach would be provided from the site's internal trail system. Public access to Lighthouse Beach is not included in the design. It is not anticipated that overflow parking at Sunset Beach State Park would occur because adequate parking would be provided within the Gregory Point site.

Because it is a specialized recreational use, the proposal is not expected to generate secondary development, or attract additional residential development, to the area.

The Gregory Point site already is partially developed with U.S. Coast Guard facilities. Therefore, building the proposed interpretive center and its associated facilities and trails would result in fewer land use impacts on the site and its surroundings than would be expected to occur at the undeveloped Yoakam Point and Coos Head sites.

Planning and Zoning. Educational-associated facilities and park facilities are permitted in the southern one-half of the Gregory Point site, which is zoned Recreation (REC), subject to any conditional use application that may be required if the site falls within a special consideration area (Kerns, pers. comm., 1995). This type of park facility is subject to conditional use requirements in the Forest (F) zone, which covers the northern one-half of the site. Therefore, a conditional use permit would be required to build the proposed interpretive center. Other special considerations that may require conditional use application include: Archaeological and Historical Sensitive Area; Natural Hazards removal of headlands by ocean waves; and Development Potential within Ocean Shorelands and Dunes.

As discussed earlier in this section, most of the Gregory Point site lies within the Coastal Shoreland Boundary and is identified as having steep bluffs over 30% slope, or being areas of exceptional scenic quality and coastal headlands. Therefore, the project also must demonstrate compliance with Goal 17, Coastal Shorelands, of the Statewide Planning Goals. Coos County has not adopted revisions to its Goal 17 inventory. Under existing Goal 17 provisions, facilities such as the proposed interpretive center are allowed under certain conditions (Evernden, pers. comm., 1995).

Statewide Planning Goals. Statewide Planning Goals apply as follows:

Goal 1. Citizen Involvement. Goal 1 ensures citizen involvement in the planning process. Numerous opportunities for citizen involvement ensures that citizen concerns and issues are addressed. The EIS process includes opportunities for public comment. In addition, the local approval process requires a conditional use permit, which includes a public hearing and notice to surrounding property owners.

Goal 2. Land Use Planning. Goal 2 requires that plans be coordinated and sets forth the process for exceptions to goal requirements. The proposed development is consistent with the local comprehensive plan and is permitted by conditional use (Kerns, pers. comm. 1995). Based on review by the Coos County Planning staff, no goal exceptions are anticipated.

Goal 3. Agricultural Lands. Goal 3 requires protection of agricultural lands. The Gregory Point site is planned and zoned for Recreation (REC) and Forest (F) uses. The Forest (F) zone is mapped as a Mixed Use Zone, which includes farm uses. The

Goal is satisfied through compliance with local conditional use permitting procedures for park facilities in the Forest (F) zone.

Goal 4. Forest Lands. Goal 4 requires protection of forest lands. The Gregory Point site is planned and zoned for Recreation (REC) and Forest (F) uses. The Forest (F) zone is mapped as a Mixed Use Zone, which includes farm uses. The Goal is satisfied through compliance with local conditional use permitting procedures for park facilities in the Forest (F) zone.

Goal 5. Open Spaces, Scenic and Historic Areas, and Natural Areas. Goal 5 requires protection of a variety of natural and historic resources. The Coos County Comprehensive Plan includes inventories for Archeological and Historical Sensitive Areas and Biological Sensitive Areas. The zoning ordinance includes provisions to protect these resources.

The Gregory Point site includes an Archeological and Historical Sensitive Area. Goal 5 can be satisfied by following the local protection procedures, which require application of the conditional-use process. Wetlands on the site have not been inventoried by the County and therefore are not subject to local procedures. Wetlands will be protected by following state (DSL) and federal (COE) procedures.

Goal 6. Air, Water, and Land Resources Quality. Goal 6 requires maintenance and improvement of air, water, and land-resources quality. Goal 6 is implemented through plan provisions that encourage compliance with state and federal regulations. The State Department of Environmental Quality is responsible for ensuring that on-site sewage disposal meets health standards. The Gregory Point Site would utilize the nearby sanitary sewer at Sunset Bay park.

Goal 7. Areas Subject to Natural Disasters and Hazards. Goal 7 addresses flood and geologic hazards. The Gregory Point site is not identified as a hazard area on the Natural Hazards Inventory Map in the County Comprehensive Plan (Coos County Planning Department 1984). The County plan map entitled Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) identifies the area as being subject to sporadic or slow headland erosion.

Goal 8. Recreation Needs. The goal requires local governments to meet the recreation needs of it citizens and visitors. The proposed development expands recreational opportunities by offering interpretive opportunities for both local residents and tourists.

Goal 9. Economy of the State. Goal 9 requires local governments to plan for diversification and improvement of the economy. The proposed development enhances the economy by expanding opportunities and attractions for tourists.

Goal 10. Housing. Goal 10 requires that the housing needs of the citizens be met. The goal is not relevant to the proposed development.

Goal 11. Public Facilities and Services. Goal 11 requires that public facilities and services be planned and provided in a timely, orderly, and efficient manner. Sewer and water service to the proposed site will represent an extension of services outside of an urban growth boundary. Currently, County policy allows such extension for public parks but the policy does not address facilities such as interpretive centers. A potential conflict with Goal 11 may exist unless County policy can be clarified to allow service provision for the proposed development.

Goal 12. Transportation. Goal 12 requires that transportation needs be met. The administrative rule implementing Goal 12 requires that local transportation system plans be completed. Access and transportation is addressed in section 3.2.8 of this document. With development of the site, necessary improvements will be installed consistent with transportation needs.

Goal 13. Energy Conservation. Goal 13 requires conservation of energy through management of land uses. The goal is satisfied through compliance with local building code requirements. In addition, energy conservation is promoted by locating the interpretive center near Sunset Bay State Park. This will allow visitors to link vehicle trips and visit both facilities thereby avoiding longer, out-of-direction trips.

Goal 14. Urbanization. Goal 14 and associated rules set forth the procedures and standards for urban growth boundaries and urban development. As noted under Goal 11, the provision of utility service beyond the urban growth boundary may be a conflict with the goal. A change in county policy to allow extension of utilities for the interpretive center may be necessary.

Goal 15. Willamette Greenway. The goal addresses development along the Willamette River and does not apply.

Goal 16. Estuarine Resources. Goal 16 addresses development along estuaries. The Gregory Point site is not located within Coos County's estuarine resource protection zones and the goal does not apply.

Goal 17. Coastal Shorelands. The Coastal Shorelands goal requires local governments to inventory and protect shorelands and headlands. The Gregory Point site is included within the Coastal Shorelands Boundary on the County's Coastal Shorelands Inventory Map (Coos County Planning Department 1984). The site inventory notes that the site includes "steep bluffs" and "areas of exceptional scenic quality and coastal headlands." The County map for Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) notes sporadic to headland erosion at the site. Any development on the site will satisfy goal 17 through compliance with County implementing provisions and the conditional use procedure.

Goal 18. Beaches and Dunes. Goal 18 addresses management of beaches and dunes. The proposed site development does not affect beaches or dunes. Applicable Coos County goal 18 provisions are also addresses under goal 17 procedures.

Goal 19. Ocean Resources. Goal 19 addresses off-shore resources. The goal is not applicable.

Yoakam Point

Land Use. The proposed interpretive center Yoakam Point would be located roughly in the center of the site, with parking to the west and the proposed recreated Indian village to the east (see Figure 4). Trails would wind through the site, connecting the facilities and providing overlooks on the point. No access to the beach would be provided from within the site. Access would be from Cape Arago Highway.

The proposed use on the Yoakam Point site would be consistent with adjacent recreational, residential, and agricultural land uses. Although the proposal would introduce structures to what currently is undeveloped forest (Yoakam Point State Park), most of the facilities would not be visible from adjacent areas or the highway because of buffering provided by heavy forest cover on the site. The nearest residences along the bluff above Lighthouse Beach (to the west) would be separated from the proposed parking facilities by a buffer of at least 200 feet and from the interpretive center by a buffer of about 600 feet (see Figure 4).

Use of Bastendorff Beach County Park by visitors to the Yoakam Point site likely would increase because of its proximity to the proposed interpretive center site. It is not anticipated that overflow parking from the Yoakam Point site would occur at the park, however, because adequate parking would be provided within the site.

As with the Gregory Point and Coos Head sites, the proposal is not expected to generate secondary development or attract additional residential development to the Yoakam Point area.

The proposed interpretive center and its associated facilities and trails at the Yoakam Point site would result in greater land use impacts than at the Gregory Point and Coos Head sites because it would introduce new structures into an undeveloped area - Yoakam Point State Park.

Planning and Zoning. Educational-associated facilities and park facilities are permitted in the REC zone, subject to any conditional use application that may be required if the site falls within a special-consideration area (Kerns, pers. comm., 1995). Special considerations that may require a conditional use application include: Botanical Sensitive Area; Natural Hazards removal of headlands by ocean waves; and Development Potential within Ocean Shorelands and Dunes. Because of these special considerations, it is likely a conditional use permit would be required to build the proposed interpretive center.

Similar to the Gregory Point site, most of the Yoakam Point site lies within the Coastal Shoreland Boundary and is identified as having steep bluffs (over 30% slope) or being areas of exceptional scenic quality and coastal headlands. Therefore, the project must demonstrate compliance with Goal 17, Coastal Shorelands, of the Statewide Planning Goals.

In addition, the part of the proposed facilities would be located in a Secondary Protection Area, on upland marine terrace, under the Master Plan for Sunset Bay District Parks (Oregon Parks, 1986). Therefore, it would need to be demonstrated that the proposed project is consistent with the Master Plan.

Statewide Planning Goals. Statewide Planning Goals apply as follows:

Goal 1. Citizen Involvement. Goal 1 ensures citizen involvement in the planning process. Numerous opportunities for citizen involvement ensures that citizen concerns and issues are addressed. The EIS process includes opportunities for public comment. In addition, the local approval process requires a conditional use permit, which includes a public hearing and notice to surrounding property owners.

Goal 2. Land Use Planning. Goal 2 requires that plans be coordinated and sets forth the process for exceptions to goal requirements. The proposed development is consistent with the local comprehensive plan and is permitted by conditional use (Kerns, pers. comm. 1995). Based on review by the Coos County Planning staff, no goal exceptions are anticipated.

Goal 3. Agricultural Lands. Goal 3 requires protection of agricultural lands. Yoakam Point site is planned and zoned for REC and therefore the agricultural lands goal does not apply.

Goal 4. Forest Lands. Goal 4 requires protection of forest lands. Yoakam Point site is planned and zoned for REC and therefore the agricultural lands goal does not apply.

Goal 5. Open Spaces, Scenic and Historic Areas, and Natural Areas. Goal 5 requires protection of a variety of natural and historic resources. The Coos County Comprehensive Plan includes inventories for Archeological and Historical Sensitive Areas and Biological Sensitive Areas. The zoning ordinance includes provisions to protect these resources.

The Yoakam Point Site does not include any inventoried goal 5 resources. Wetlands on the site have not been inventoried by the County and therefore are not subject to local procedures. Wetlands will be protected by following state (DSL) and federal (COE) procedures. A Biological Sensitive Area is located south of the site.

Goal 6. Air, Water, and Land Resources Quality. Goal 6 requires maintenance and improvement of air, water, and land resources quality. Goal 6 is implemented through plan provisions which encourage compliance with state and federal regulations. The

State Department of Environmental Quality is responsible for ensuring that on-site sewage disposal meets health standards. The Yoakam Point Site would utilize the nearby sanitary sewer at Sunset Bay State Park.

Goal 7. Areas Subject to Natural Disasters and Hazards. Goal 7 addresses flood and geologic hazards. The Yoakam Point site is not identified as a hazard area on the Natural Hazards Inventory Map in the County Comprehensive Plan (Coos County Planning Department 1984). The County plan map entitled Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) identifies the area as being subject to sporadic or slow headland erosion.

Goal 8. Recreation Needs. The goal requires local governments to meet the recreation needs of it citizens and visitors. The proposed development expands recreational opportunities by offering interpretive opportunities for both local residents and tourists.

Goal 9. Economy of the State. Goal 9 requires local governments to plan for diversification and improvement of the economy. The proposed development enhances the economy by expanding opportunities and attractions for tourists.

Goal 10. Housing. Goal 10 requires that the housing needs of the citizens be met. The goal is not relevant to the proposed development.

Goal 11. Public Facilities and Services. Goal 11 requires that public facilities and services be planned and provided in a timely, orderly, and efficient manner. Sewer and water service to the proposed site will represent an extension of services outside of an urban growth boundary. Currently, County policy allows such extension for public parks but the policy does not address facilities such as interpretive centers. A potential conflict with goal 11 may exist unless County policy can be clarified to allow service provision for the proposed development.

Goal 12. Transportation. Goal 12 requires that transportation needs be met. The administrative rule implementing goal 12 requires that local transportation systems plan be completed. Access and transportation is addressed in section 3.2.8 of this document. With development of the site, necessary improvements will be installed consistent with transportation needs.

Goal 13. Energy Conservation. Goal 13 requires conservation of energy through management of land uses. The goal is satisfied through compliance with local building code requirements. In addition, energy conservation is promoted by locating the interpretive center near Sunset Bay State Park. This will allow visitors to link vehicle trips and visit both facilities thereby avoiding longer out-of-direction trips.

Goal 14. Urbanization. Goal 14 and associated rules set forth the procedures and standards for urban growth boundaries and urban development. As noted under goal 11, the provision of utility service beyond the urban growth boundary may be a conflict with the goal. A change in county policy to allow extension of utilities for the interpretive center may be necessary.

Goal 15. Willamette Greenway. The goal address development along the Willamette River and does not apply.

Goal 16. Estuarine Resources. Goal 16 addresses development along estuaries. The Yoakam Point site is not located within Coos County's estuarine resource protection zones and the goal does not apply.

Goal 17. Coastal Shorelands. The Coastal Shorelands goal requires local governments to inventory and protect shorelands and headlands. The Yoakam Point site is included within the Coastal Shorelands Boundary on the County's Coastal Shorelands Inventory Map (Coos County Planning Department 1984). The site inventory notes that the site includes "steep bluffs" and "areas of exceptional scenic quality and coastal headlands." The County map for Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) notes sporadic to headland erosion at the site. Any development on the site will satisfy goal 17 through compliance with County implementing provisions and the conditional-use procedure.

Goal 18. Beaches and Dunes. Goal 18 addresses management of beaches and dunes. The proposed site development does not affect beaches or dunes. Applicable Coos County goal 18 provisions are also addresses under goal 17 procedures.

Goal 19. Ocean Resources. Goal 19 addresses off-shore resources. The goal is not applicable.

Coos Head

Land Use. At the Coos Head site, the proposed interpretive center would be built on the west part of the site, with parking and the proposed recreated Indian village to the east (see Figure 5). Trails would connect the interpretive center with trails and facilities on the site, and with Bastendorff Beach County Park to the west. Access to the Yoakam Point site would be from Cape Arago Highway via Coos Head Road and Coos Head Bastendorff Beach Road.

The proposal would introduce new structures into the undeveloped forest on Coos Head. However, the surrounding area already is developed with the Coos Head U.S. Naval Facility and Bastendorff Beach County Park, as well as some residential uses. A change in land use on the site from forest to an interpretive center would be consistent with these other uses.

Residences on the south side of Tunnel Point Lane currently are fairly isolated from other developed uses by dense forest. The proposal would introduce structures nearby; however, most of the facilities would not be visible from adjacent areas or the road because of buffering provided by heavy forest cover on the site. The nearest residences would be separated from the parking lots within the site by a buffer of at least 150 feet and from the interpretive center by about 300 feet (see Figure 5).

Use of Bastendorff Beach County Park by visitors to the Coos Head site likely would increase because access to the park and beach would be provided from the site's internal trail system. It is not anticipated that overflow parking at the park would occur because adequate parking would be provided within the Coos Head site.

Similar to the Gregory Point and Yoakam Point sites, the proposal is not expected to generate secondary development, or attract additional residential development, to the Coos Head area.

Planning and Zoning. Park facilities in the F zone are subject to conditional-use requirements (Kerns, pers. comm., 1995). Special considerations for this site include: Beaches and Dunes limited and not suitable development areas; Natural Hazards beach erosion and deposition; and Development Potential within Ocean Shorelands and Dunes. Under Coos County regulations, development would be allowed in Beach and Dunes limited areas subject to a conditional use permit; development would not be permitted in the not suitable areas unless a geological report proves the site is suitable (Evernden, pers. comm., 1995). Because the project is federal and would occur on federally-owned land, Coos County would not review the proposal (Evernden, pers. comm., 1995).

As discussed earlier in this section, the Coos Head site lies within the Coastal Shoreland Boundary, with the northern one-half of the site identified as being areas of exceptional scenic quality and coastal headlands. Therefore, the project must demonstrate compliance with Goal 17, Coastal Shorelands, of the Statewide Planning Goals.

Statewide Planning Goals. Statewide Planning Goals apply as follows:

Goal 1. Citizen Involvement. Goal 1 ensures citizen involvement in the planning process. Numerous opportunities for citizen involvement ensure that citizen concerns and issues are addressed. The EIS process includes opportunities for public comment. In addition, the local approval process requires a conditional use permit, which includes a public hearing and notice to surrounding property owners.

Goal 2. Land Use Planning. Goal 2 requires that plans be coordinated and sets forth the process for exceptions to goal requirements. The proposed development is consistent with the local comprehensive plan and is permitted by conditional use (Kerns, pers. comm. 1995). Based on review by the Coos County Planning staff, no goal exceptions are anticipated.

Goal 3. Agricultural Lands. Goal 3 requires protection of agricultural lands. The Coos Head site is planned and zoned for forest use and therefore the agricultural lands goal does not apply.

Goal 4. Forest Lands. Goal 4 requires protection of forest lands. The Coos Head site is planned and zoned F. The goal is satisfied through compliance with local conditional use permitting procedures that allow park facilities in the zone.

Goal 5. Open Spaces, Scenic and Historic Areas, and Natural Areas. Goal 5 requires protection of a variety of natural and historic resources. The Coos County Comprehensive Plan includes inventories for Archeological and Historical Sensitive Areas and Biological Sensitive Areas. The zoning ordinance includes provisions to protect these resources.

The Coos Head Site does not include any inventoried goal 5 resources. Wetlands on the site have not been inventoried by the County and therefore are not subject to local procedures. Wetlands will be protected by following state (DSL) and federal (COE) procedures.

Goal 6. Air, Water, and Land Resources Quality. Goal 6 requires maintenance and improvement of air, water, and land-resources quality. Goal 6 is implemented through plan provisions that encourage compliance with state and federal regulations. The State Department of Environmental Quality is responsible for assuring that on-site sewage disposal meets health standards. The Coos Head Site would utilize the nearby Charleston sanitary sewer system.

Goal 7. Areas Subject to Natural Disasters and Hazards. Goal 7 addresses flood and geologic hazards. The Coos Head site is not identified as a hazard area on the Natural Hazards Inventory Map in the County Comprehensive Plan (Coos County Planning Department 1984). The County plan map entitled Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) identifies the area as being subject to potential beach erosion. Based on FEMA maps, the site includes an area within the 500-year flood boundary. County flood hazard protection requirements apply in this area.

Goal 8. Recreation Needs. The goal requires local governments to meet the recreation needs of it citizens and visitors. The proposed development expands recreational opportunities by offering interpretive opportunities for both local residents and tourists.

Goal 9. Economy of the State. Goal 9 requires local governments to plan for diversification and improvement of the economy. The proposed development enhances the economy by expanding opportunities and attractions for tourists.

Goal 10. Housing. Goal 10 requires that the housing needs of the citizens be met. The goal is not relevant to the proposed development.

Goal 11. Public Facilities and Services. Goal 11 requires that public facilities and services be planned and provided in a timely, orderly, and efficient manner. Sewer and water service to the proposed site will represent an extension of services outside of an urban growth boundary. Currently, County policy allows such extension for public parks but the policy does not address facilities such as interpretive centers. A potential conflict with goal 11 may exist unless County policy can be clarified to allow service provision for the proposed development.

Goal 12. Transportation. Goal 12 requires that transportation needs be met. The administrative rule implementing goal 12 requires that local transportation systems plan be completed. Access and transportation is addressed in section 3.2.8 of this document. With development of the site, necessary improvements will be installed consistent with transportation needs.

Goal 13. Energy Conservation. Goal 13 requires conservation of energy through management of land uses. The goal is satisfied through compliance with local building code requirements. In addition, energy conservation is promoted by locating the interpretive center near Sunset Bay State Park. This will allow visitors to link vehicle trips and visit both facilities thereby avoiding longer out-of-direction trips.

Goal 14. Urbanization. Goal 14 and associated rules set forth the procedures and standards for urban growth boundaries and urban development. As noted under goal 11, the provision of utility service beyond the urban growth boundary may be a conflict with the goal. A change in County policy to allow extension of utilities for the interpretive center may be necessary.

Goal 15. Willamette Greenway. The goal address development along the Willamette River and does not apply.

Goal 16. Estuarine Resources. Goal 16 addresses development along estuaries. The portion of the Coos Head site under consideration for development is not located within Coos County's estuarine resource protection zones. The portion of the shore 1,100 feet south of the jetty is subject to estuarine management policies and is zoned 68B-WD Water-Dependent Development Shorelands. Special conditions apply to development in this zone.

Goal 17. Coastal Shorelands. The Coastal Shorelands goal requires local governments to inventory and protect shorelands and headlands. The Coos Head site is included within the Coastal Shorelands Boundary on the County's Coastal Shorelands Inventory Map (Coos County Planning Department 1984). The site inventory notes that the site includes "areas of exceptional scenic quality and coastal headlands." The County map for Development Potential within Ocean Shorelands and Dunes (Coos County Planning Department 1984) identifies the area as an area of "limited suitability; special measures required for most development." The map also identifies the area as being subject to "potential beach erosion." Any development on the site will satisfy goal 17 through compliance with County implementing provisions and the conditional use procedure.

Goal 18. Beaches and Dunes. Goal 18 addresses management of beaches and dunes. The proposed site development does not affect beaches or dunes. Applicable Coos County goal 18 provisions are also addresses under goal 17 procedures.

Goal 19. Ocean Resources. Goal 19 addresses off-shore resources. The goal is not applicable.

No Action Alternative

Under the No Action Alternative, existing land uses would continue on all three sites. Therefore, no land use impacts would be expected.

3.2.4.3 Mitigation Measures

The proposed site design at each site would include several features to minimize impacts on surrounding land uses. The proposal would include buffers between new structures and adjacent areas. Existing vegetation would be retained where possible, and the site would be landscaped to maintain a natural appearance.

Adequate parking spaces would be provided to eliminate any overflow onto adjacent roads or nearby parks. The proposal would comply with parking requirements as set forth in the Coos County Zoning and Land Development Ordinance (CCZLDO).

For those areas within identified natural hazard areas, geologic studies will be conducted to eliminate potential impacts on headland and beach erosion. The proposal would comply with Goal 17 of the Statewide Planning Goals.

Mitigation measures appropriate to the site would be identified in any conditional use permits required for the project.

Gregory Point

A trail system would connect the proposed interpretive center and associated facilities with Sunset Beach State Park. Public access to Lighthouse Beach, if included in the design, would discourage trespassing across private residential property. Residences to the east would be separated from any structures by a vegetated buffer.

Yoakam Point

Residences to the west would be separated from any on-site structures by a vegetated buffer. Structures on the site could avoid areas identified in the Master Plan for Sunset Bay District Parks as Secondary Protection Areas and be located in areas identified as Limited Development Areas. Public access to Lighthouse Beach would reduce trespassing across private property.

Coos Head

Residences to the south would be separated from on-site facilities by a vegetated buffer. A trail system would connect the proposed facilities to Bastendorff Beach County Park. Structures could be located away from areas rated as not suitable for development under the Development Potential Within Ocean Shorelines and Dunes, and a geological investigation would be conducted to mitigate impacts within natural hazard areas.

3.2.5 RECREATION

3.2.5.1 Affected Environment

Regional

Coos County includes a number of recreation resources oriented both to county residents and to visitors from elsewhere in Oregon and from out-of-state. According to staff at the Coos County Parks and Recreation Department, there are capacity limitations during summer peak periods at some county facilities, particular those near the shoreline that are used by recreation visitors to the county. The county has preliminary plans for expansion of certain of its facilities, focusing in particularly on camping and group activity capacity.

Recreation facilities operated by the City of Coos Bay, primarily for its residents, currently have adequate capacity as well as capacity for expanded population, according to city staff. In addition, a Boys and Girls Club currently under construction would provide extensive new capacity for summer and winter activity for youth of the area.

Gregory Point, Yoakam Point, and Coos Head

All social and economic aspects of the affected environment affect the sites equally and are discussed above.

3.2.5.2 Environmental Consequences

Gregory Point

New demand for local recreation facilities would be generated to the extent that employment opportunities associated with the proposed facility attract new population to the area. Projected direct and indirect employment amounts to 167 people. Given the current unemployment conditions among tribal and non-tribal residents in the county, it is assumed that a substantial portion of these jobs would be taken by current residents. For the City of Coos Bay there is adequate capacity in local green space and parks facilities for any population expansion associated with the remainder of these employees. This level of population, however, may increase pressure on county recreation facilities, particularly those near the shore, and would increase current pressures on Coos County to expand recreation facilities.

In addition, the increase in visitor activity in the Charleston area may generate additional demand for existing state park and other recreation opportunities on adjacent coastal locations. While it is not known what portion of visitors to the proposed facility would represent new visitors to the area as well as visitors to these adjacent facilities, if an estimated 10% of facility visitors also were to represent new visitation to these facilities this would amount to approximately 27,000 additional visitors per year. To the extent that these adjacent facilities now operate at or near capacity, this additional demand would necessitate additional facility capacity improvements and/or changes in management in order to avoid undesirable crowding.

Yoakam Point and Coos Head

Environmental consequences for each of these additional sites are the same as those for Gregory Point and are discussed in the section immediately above.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.5.3 Mitigation Measures

Gregory Point

Population growth associated with the proposed facility would be small but would result in some additional demand on local area recreation facilities. This additional demand can be mitigated by using the capacity of the proposed facility to the extent possible for new recreation programs oriented to the resident population, particularly those programs with an educational focus such as for arts and crafts, performance, and history.

Yoakam Point and Coos Head

Mitigation measures for each of these additional sites are the same as those for Gregory Point and are discussed in the section immediately above.

3.2.6 VISUAL RESOURCES

3.2.6.1 Affected Environment

Regional

The project sites are located in a highly scenic area -- the rugged Oregon coast. The landscape is dominated by sandy beaches, rocky intertidal areas, sheer cliffs, and broad dunal plains. It is an area of stark visual contrasts, dense upland forests, and sparse development.

The primary view opportunities in the project area are from the public beaches and parks, such as Bastendorff and Lighthouse Beaches, Bastendorff Beach County Park, and Sunset Bay State Park. View opportunities at Lighthouse Beach are limited because privately-owned residences on the bluff above inhibit public access. Both Gregory Point and Yoakam Point are visible from these residences.

Views of the project sites for drivers along the Cape Arago Highway are limited by existing dense forest vegetation and topography. From most locations on the highway, it is not possible to see the headlands or beaches; however, occasional glimpses of the sites are possible.

Each project site offers many views of the rugged coastal environment, yet each site is unique in character.

Gregory Point

Gregory Point offers views of forested uplands, sheer cliffs, rocky headlands, and the Cape Arago Lighthouse, which is located on Chief's Island north of Gregory Point. Of the three sites, Gregory Point is the only one that is partially developed -- with the lighthouse and U.S. Coast Guard housing. The housing structures are screened by existing vegetation and are visible only from the lighthouse; they are not visible from surrounding areas. The site itself is densely forested, except where the housing and lighthouse are located; these areas are vegetated with grasses and other low-growing plants.

From Sunset Beach, which is south of the Gregory Point site, the cliffs on the south side of the site are visible, but the Cape Arago Lighthouse and headlands are not. Farther to the south, at a pulloff from the Cape Arago Highway at Norton Gulch, the headlands and lighthouse both are visible.

The Gregory Point site is visible from privately-owned residences on the bluff above Lighthouse Beach; however, views from individual houses may be blocked by topography and adjacent houses. Gregory Point and the lighthouse also are visible from Yoakam Point, farther to the north.

From the southwestern half of Bastendorff Beach and the Bastendorff Beach County Park overlook, on the north side of Yoakam Point, the Gregory Point headlands are visible, but a view of the Cape Arago Lighthouse is obstructed by Yoakam Point. As one moves northeast along Bastendorff Beach toward the South Jetty, the lighthouse becomes visible in the distance.

Limited views of Gregory Point are available from the Cape Arago Highway, which borders the site on the east. Southbound, Gregory Point is partially visible from the highway in the area of the residences above Lighthouse Beach. Northbound, drivers on the highway along Sunset Beach have a sweeping view of the south and west cliffs of Gregory Point, but not of the headlands or the lighthouse. From the section of the highway adjacent to Gregory Point, only dense upland forest is visible, not the headlands or beach.

Yoakam Point

Yoakam Point offers views of beaches, rocky headlands, exposed cliffs, and forested uplands to the north and south. The site itself is undeveloped and characterized by sheer cliffs and exposed rock faces in the intertidal area, and low shrubs, sparse individual trees, and clumps of forest throughout the rest of the site.

From the tip of Gregory Point, the Yoakam Point site is visible from the Cape Arago Lighthouse and U.S. Coast Guard housing; however, the public does not have access to this view. The Yoakam Point site is not visible from Sunset Beach or locations farther to the south.

Yoakam Point is visible from the privately-owned residences on the bluff above Lighthouse Beach, located southwest of the site, although views are blocked to varying degrees by topography and adjacent houses.

From Bastendorff Beach and the Bastendorff Beach County Park overlook, located further to the north, the Yoakam Point site is visible. Similar views are available from the Coos Head site.

Views of the Yoakam Point site from Cape Arago Highway, which borders it on the south, are of dense forest. The headlands of Yoakam Point are not visible adjacent to the site. Drivers headed southbound on the highway may glimpse the tops of trees just east of Yoakam Point. The point is not visible northbound.

Coos Head

Coos Head offers views of Bastendorff Beach, Yoakam Point to the south, and the South Jetty to the north. The site itself is dominated by dense forest on the uplands and steep bluffs, with only small areas of cliff visible. Bastendorff Beach is located at the bottom of the bluffs. Because it lacks headlands, the appearance of the Coos Head site is substantially different from that of the Gregory Point and Yoakam Point sites.

Coos Head is not visible from Lighthouse Beach and Sunset Bay, both located at a substantial distance to the southwest. However, a distant view of the site is possible from the U.S. Coast Guard facility at the north end of Gregory Point.

Coos Head is visible from Yoakam Point, Bastendorff Beach, Bastendorff Beach Road, and the overlook at Bastendorff Beach County Park. Because of the length of Bastendorff Beach, the north and south ends of the beach offer different view angles of the Coos Head site.

The Coos Head site is not visible to drivers on the Cape Arago Highway, because the site is located a substantial distance from the highway and existing vegetation and topography block the view.

3.2.6.2 Environmental Consequences

In order to evaluate environmental consequences of locating the proposed project on one of the three possible sites, a general description of visibility of the project at each site was prepared. In addition, an abbreviated version of the BLM's Visual Resource Contrast Rating (BLM Manual Handbook 8431-1) was used.

For each site, two or three key observation points (KOP) were identified, one or two each to the north and south of the site. For each KOP, the elements of form, line, color, and texture for land/water, vegetation, and structures were evaluated for the existing view and the view with the proposed project. For this evaluation, removal of vegetation on the site was considered a vegetative feature, and construction/visibility of the proposed interpretive center and observation tower was considered a structural feature; no landform/water features of the proposed project were identified for evaluation. The degree of contrast for vegetation and structure then was identified for each KOP using the following criteria:

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Mitigation measures were identified based on the overall visibility of the proposed project as well as the degree of contrast rating for the KOPs.

Gregory Point - Project Visibility

Development of the proposed project on the Gregory Point site would not affect views from Sunset Bay. From this location, views of the site are limited to the southern cliffs of Gregory Point. The interpretive center building would be set back a minimum of 500 feet from the cliffs, which would not be disturbed by the proposal. It is possible the proposed observation tower would be visible above the tree line, particularly from the southern end of Sunset Beach; however, this would not substantially affect the view.

The proposal would affect views from Lighthouse Beach and Yoakam Point, locations from which the observation tower would be most visible. Because existing views from these locations already include structures, such as privately-owned residences and the Cape Arago Lighthouse, the effect on views would not be substantial.

Views from the Bastendorff Beach County Park overlook, Coos Head, or the southern part of Bastendorff Beach would not be affected. New structures would not be located on the part of the headlands visible from these locations. Views of Gregory Point from the northeastern part of the Bastendorff Beach, near the South Jetty, would be affected because the observation tower would be visible above the tree line. At that distance, however, the new structure would not substantially change the existing view.

The proposal would increase views of the Cape Arago Lighthouse for the public by providing access to Gregory Point. The public currently does not have access to the U.S. Coast Guard facilities; therefore, views of the lighthouse are from a distance.

Views from drivers along Cape Arago Highway would not be affected. Few view opportunities currently exist, and the site would be landscaped and buffered to maintain natural appearance. Structures at Gregory Point would be screened from views on the Cape Arago Highway by a buffer of at least 300 feet.

Gregory Point - Visual Resource Contrast Rating

Two KOPs were identified and evaluated for the Gregory Point site (see Figure 15). These include:

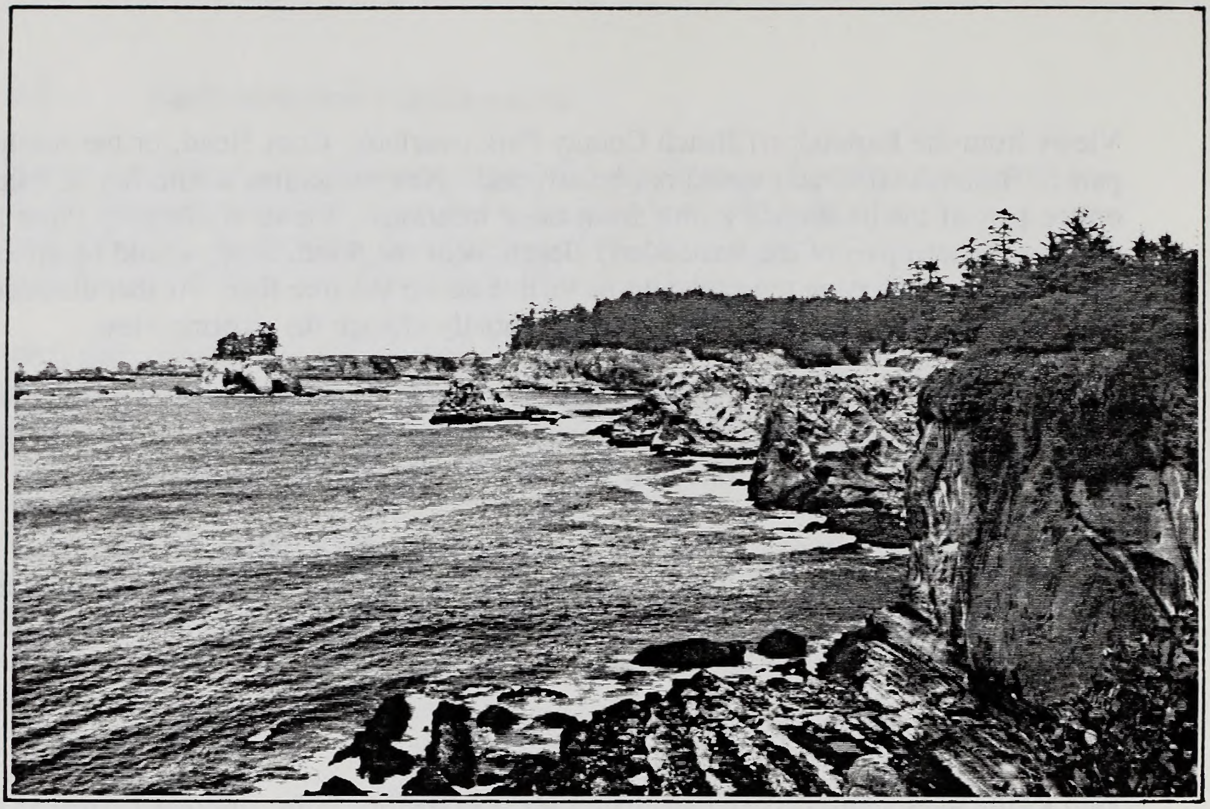
KOP #1	Sunset Beach and Norton Gulch looking north; and
KOP #2	Lighthouse Beach looking south.

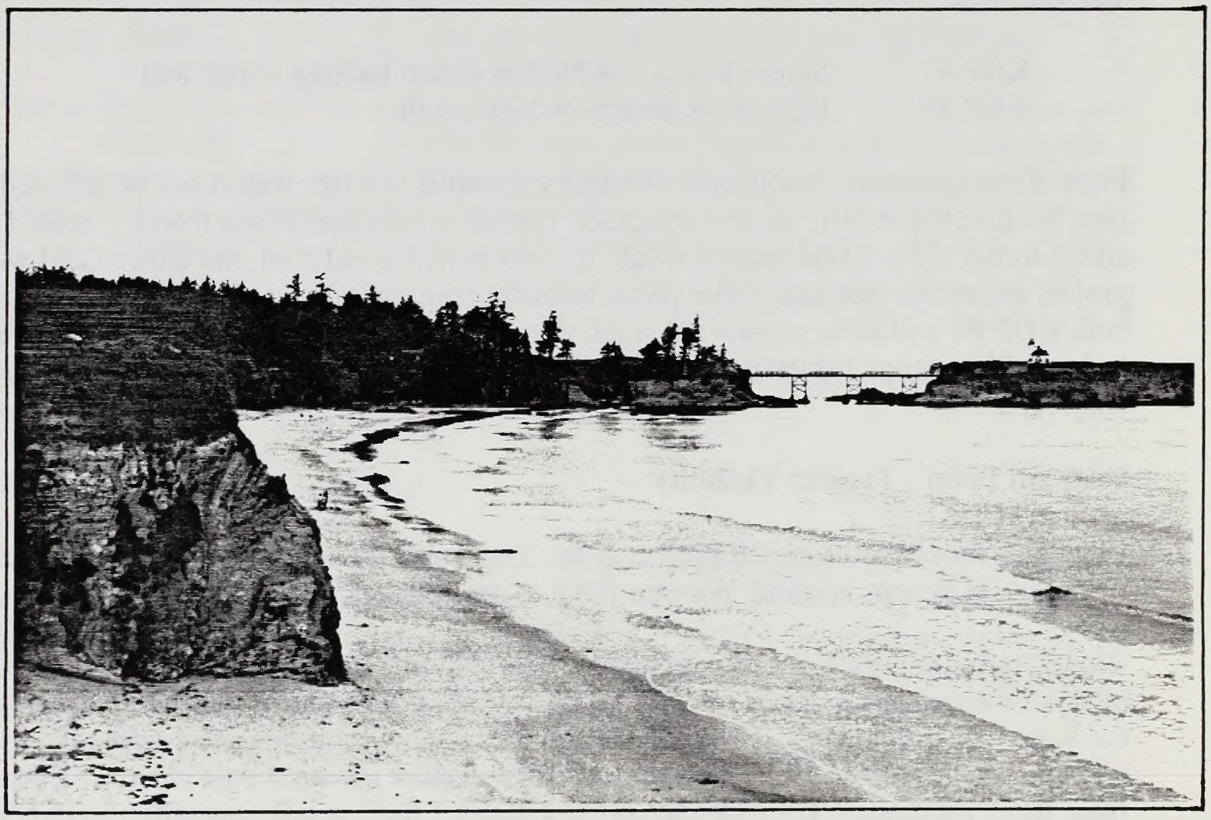
From these locations, landform/water and vegetative features would not be affected (see Tables 29 and 30). A new structural feature -- the observation tower -- would be added to the view. This feature would be brown with a red roof and lantern and would project above the tree line. The visual resource contrast rating for the feature from both KOP #1 and #2 is considered weak to moderate because the feature would be seen and would begin to attract attention, but would not begin to dominate the characteristic landscape.

Yoakam Point - Project Visibility

Development of the proposed project at the Yoakam Point site would not affect views from Sunset Beach, because Yoakam Point is not visible from this location.

Views from Gregory Point, Lighthouse Beach, and privately-owned residences on the bluff above the beach would be affected. Clearing of some trees to provide views of the water and Cape Arago Lighthouse from the proposed interpretive center, and visibility of the center itself, as well as the observation tower, would change views from these locations. The extent of effect on views from residences above Lighthouse Beach would vary at each individual house, because views from certain locations are obstructed by topography and other residences. The effect also would be reduced because existing views from these residences already include other residences and the interpretive center and tower would appear as another building along the bluffs.





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Top photograph (#25) is taken from Norton Gulch (southwest of Sunset Beach) looking north to the Gregory Point site. Bottom photograph (#34) is taken from Lighthouse Beach looking south toward Gregory Point.

FIGURE
15

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Table 29. Gregory Point – Key Observation Point #1 – Norton Gulch looking north (Photos #25)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat and angular (cliffs)	Simple (tree mass) accented by vegetative forms	(Lighthouse) geometric, angular with vertical tower	Only existing structure is lighthouse
Line	Horizontal and vertical (cliffs)	Horizontal with some undulation	Angular with strong vertical elements	--
Color	Blue/gray (water) to beige/brown (cliffs)	Dark to medium green (trees)	Red roofs, white siding, lantern	--
Texture	Smooth (water) to medium to coarse (bluff/cliff)	Medium to coarse grain with dense vegetation on upland	Coarse grain but sparse (only on building)	--

Project	Land/Water	Vegetation	Structures	Notes
Form	(None; roads not visible)	(Existing)	(Center tower) geometric, angular tower	Tower with lantern and red roof, visible above tree line
Line	--	--	Vertical, angular, stark contrast with tree line	--
Color	--	--	Brown with red roof and lantern	--
Texture	--	--	Coarse, but small in scale from this distance	--

Contrast: Land/Water: None
Vegetation: None
Structure: Weak to moderate

* No vegetation removal would be needed to provide views of lighthouse and water.

Table 30. Gregory Point – Key Observation Point #2 – Lighthouse Beach looking south (Photo #34)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (water beach) and angular (cliffs & headland)	Simple (tree mass) with individual trees and vegetative forms	(Lighthouse and bridge) geometric angular building with tower	– –
Line	Horizontal (water beach) and vertical (cliffs)	Horizontal with undulation and some patchy spots	Horizontal (bridge) and vertical (tower); angular	– –
Color	Blue/gray (water) to gray (cliffs) and beige (sand)	Dark (trees) to light (grass) green	Gray (bridge), white and red (roof)	– –
Texture	Smooth (water), to medium/ coarse (cliffs)	Medium (trees) to smooth grain with dense trees	Smooth (bridge) to medium but sparse (only one of each)	– –

Project	Land/Water	Vegetation	Structures	Notes
Form	– –	– –	(Tower) geometric, angular tower	Tower with lantern and red roof, visible above tree line
Line	– –	– –	Vertical, angular, stark contrast with tree line	– –
Color	– –	– –	Brown with red roof and lantern	– –
Texture	– –	– –	Coarse grain, but small scale from this distance; probably more contrast from central and south (if visible) end of beach	– –

Contrast: Land/Water: None
Vegetation: None
Structure: Weak to moderate

* No vegetation removal would be needed to provide views of lighthouse and water.

Development of the proposed project on the Yoakam Point site also would affect views from Bastendorff Beach, Coos Head, and Bastendorff Beach County Park. Its undeveloped appearance would change to a more developed appearance. Part of the interpretive center, including the observation tower, would be visible and would introduce a man-made structure into an area that currently does not have any other visible structures.

Views for drivers along Cape Arago Highway would not be affected. Few view opportunities currently exist, and the site would be landscaped and buffered to maintain natural appearance. The parking area at the Yoakam Point site would be closer to the Cape Arago Highway than at the Gregory Point and Coos Head sites; however, 50-foot visual buffer would be maintained between the roadway and the parking area (see Yoakam Point Site Design, Figure 4).

Yoakam Point - Visual Resource Contrast Rating

Two KOPs were identified and evaluated for the Yoakam Point site (see Figure 16). These include:

KOP #3	Lighthouse Beach looking north; and
KOP #4	Bastendorff Beach County Park overlook looking southwest.

From these locations, landform/water features would not be affected (see Tables 31 and 32); however, both vegetative and structural features would be affected. Trees and vegetation would be removed on the point, in front of the interpretive center, to allow views of the water and the Cape Arago Lighthouse. In addition, a new structural feature -- the observation tower -- would be added to the view. As at the Gregory Point site, this feature would be brown with a red roof and lantern and would project above the tree line.

The visual contrast rating for vegetative features from both KOP #3 and #4 is considered weak because the change in cover would be seen but would not attract attention. The rating for structural features is considered weak to moderate for both KOPs because the feature would be seen and would begin to attract attention, but would not begin to dominate the characteristic landscape.

Coos Head - Project Visibility

Development of the proposed project on the Coos Head site would affect the view from the U.S. Coast Guard facility at Gregory Point; however, the change in view would not be substantial because of the distance between Coos Head and Gregory Point. In addition, the public currently does not have access to this view.

Views of Coos Head from Sunset Beach and Lighthouse Beach would not be affected, because views are blocked by the topography of Yoakam Point.

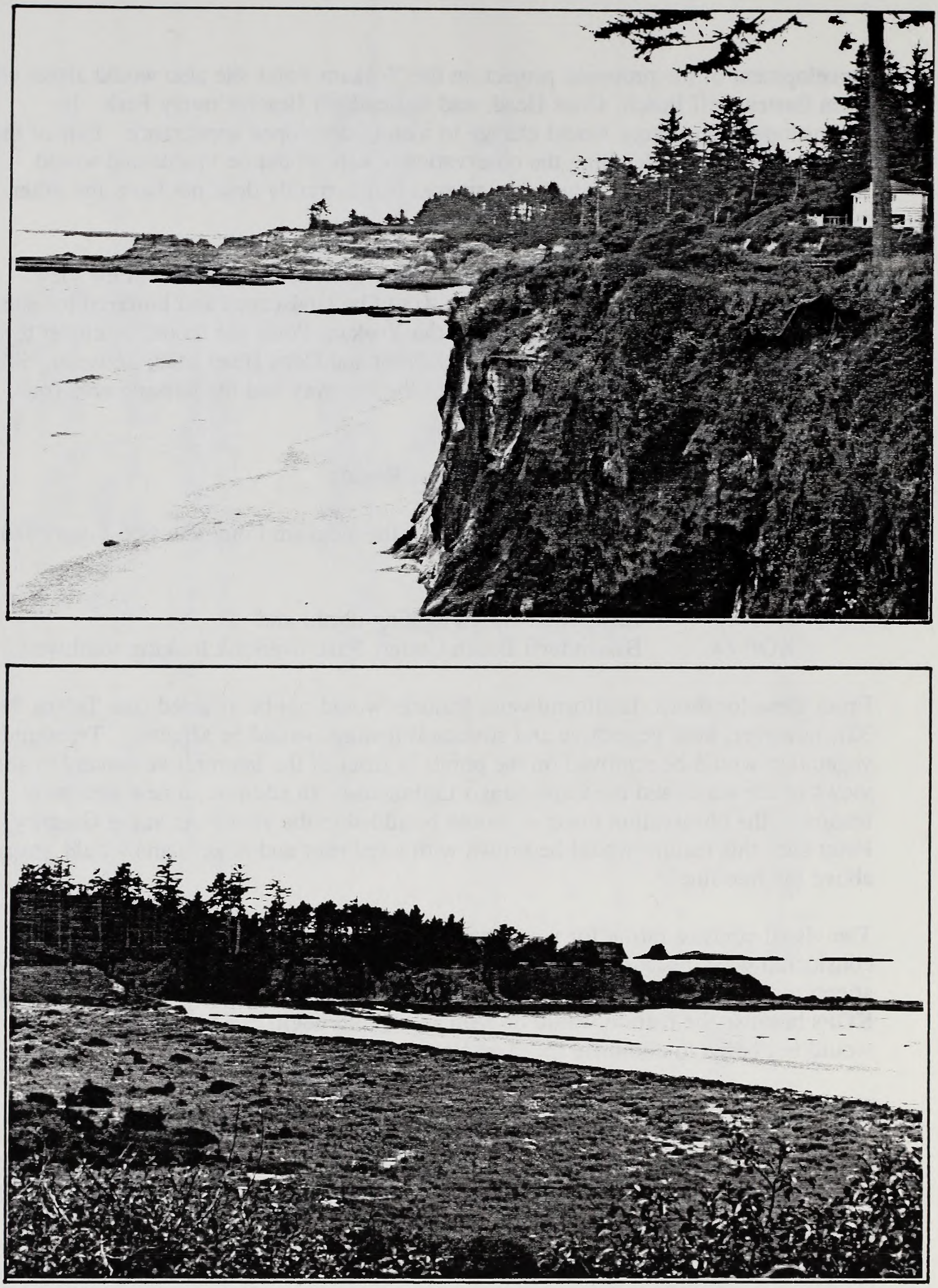

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FIGURE

16

Top photograph (#35) is taken from Lighthouse Beach looking north toward Yoakam Point. Bottom photograph (#12) is taken from Bastendorff Beach County Park overlook toward Yoakam Point to the southwest.

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Table 31. Yoakam Point – Key Observation Point #3 – LighthouseBeach looking north (Photo #35)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (water, beach) and angular (cliffs)	Smooth and simple tree mass with clumps of trees on point	(None undeveloped)	--
Line	Horizontal (water, beach) and vertical (cliffs)	Undulating with patchy spots and smooth vegetation on headland in foreground	--	--
Color	Blue/gray (water) to beige/gray/brown (cliffs)	Medium to dark green	--	--
Texture	Smooth (water) to coarse (cliffs)	Medium grain with moderately dense to sparse trees	--	--

Project	Land/Water	Vegetation	Structures	Notes
Form	--	(Removal on point for view) linear form created by clearing	(Center with tower) geometric, angular tower	Unlikely center would be visible, but tower would be
Line	--	Irregular line created by edge effect of clearing	Vertical, angular, stark contrast with tree line	--
Color	--	Medium to dark green	Brown with red roof and lantem	--
Texture	--	Enhanced patchy effect	Coarse grain, but small scale from distance; likely not visible from north end of beach	--

Contrast:

Land/Water: None
Vegetation: Weak
Structure: Weak to moderate

* Vegetation removal would be needed on point to allow views of water and lighthouse

Table 32. Yoakam Point – Key Observation Point #4 – Bastendorff Beach County Park Overlook looking southwest (Photo #12)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (water, beach) and angular (cliffs, headlands)	Undulating to irregular with individual and clumps of trees	(None undeveloped)	--
Line	Horizontal (water, beach, bluff), angular (cliff)	Undulating with patchy spots and individual trees (vertical line)	--	--
Color	Blue/gray (water) to gray/beige/brown (cliffs)	Dark green	--	--
Texture	Smooth (water) to medium/coarse (cliffs)	Coarse from patchiness and separate trees; trees dense to sparse	--	--

Project	Land/Water	Vegetation	Structures	Notes
Form	--	(Vegetation removal on point) linear form created by clearing edge	(Tower) geometric, angular tower	Center would not be visible, tower would be
Line	--	Irregular line created by edge effect of clearing	Vertical, angular, stark contrast with tree line	--
Color	--	Dark green	Brown with red roof and lantern	--
Texture	--	Enhanced patchy effect because of clearing	Coarse grain, but small scale from distance; barely visible from this vantage point	--

Contrast:
Land/Water: None
Vegetation: Weak
Structure: Weak to moderate

* Vegetation removal would be needed on point to allow views of water and lighthouse

The proposal would change views of Coos Head from Bastendorff Beach. Coos Head would no longer appear as a solid mass of vegetation. The interpretive center and recreated Indian village both would be visible through breaks in the vegetation, and the observation tower would be visible above the tree line. At these locations, removal of existing trees would be necessary to provide views of the water.

Views for drivers along Cape Arago Highway would not be affected. Drivers currently have no views of Coos Head, and existing vegetative screening would be maintained.

Coos Head - Visual Resource Contrast Rating

Three KOPs were identified and evaluated for the Coos Head site (see Figures 17 and 18). These include:

KOP #5	Bastendorff Beach (south end) looking northeast;
KOP #6	Bastendorff Beach County Park overlook looking northeast; and
KOP #7	Bastendorff Beach (north end) looking south.

From these locations, landform/water features would not be affected (see Tables 33, 34, and 35); however, both vegetative and structural features would be affected. Trees and vegetation would be removed on the west side of the site, in front of the interpretive center, to allow views of the water, and on the east side of the site, in front of the recreated Indian village. In addition, a new structural feature -- the observation tower -- would be added to the view. As at the Gregory Point and Yoakam Point sites, this feature would be brown with a red roof and lantern, and would project above the tree line.

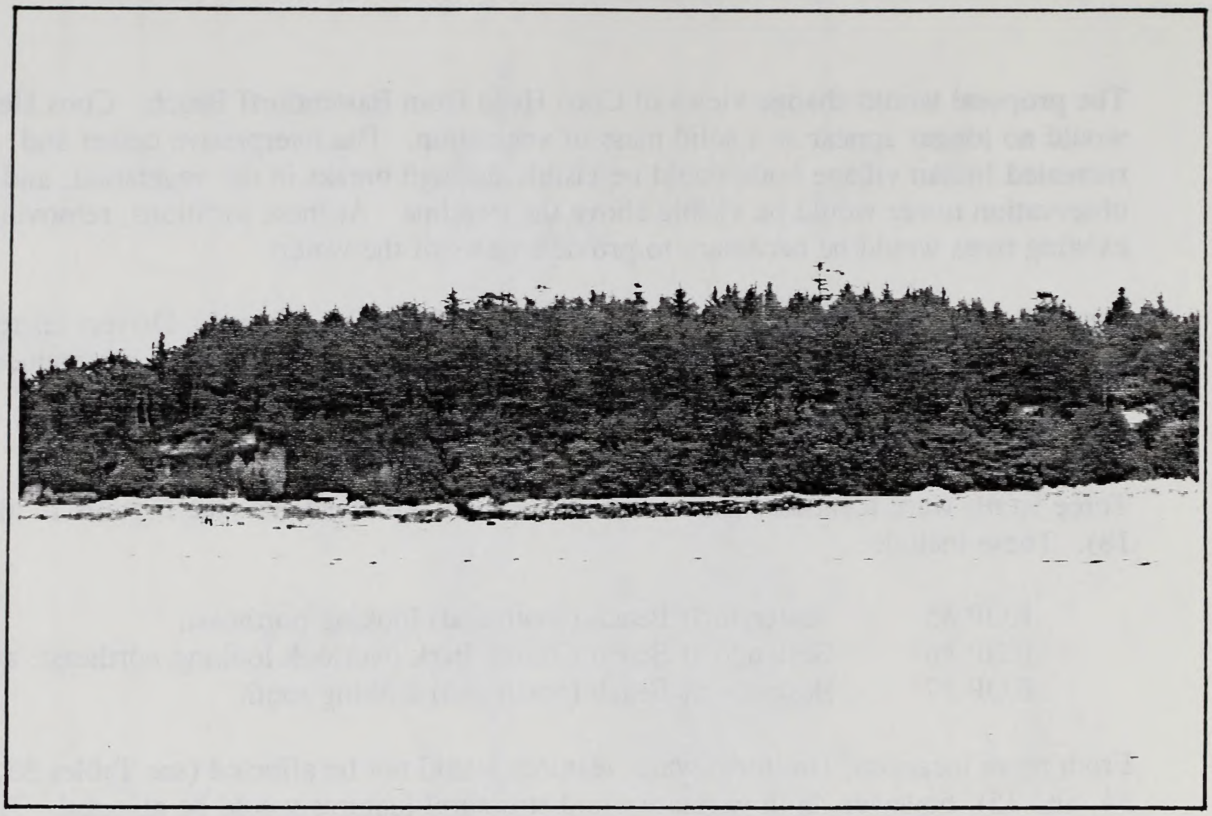
The visual contrast rating for vegetative features from all three KOPs is considered weak to moderate because the change in cover would be seen and would begin to attract attention, but would not begin to dominate the characteristic landscape. The rating for structural features is considered moderate from KOP #5, and moderate to strong for both KOP #6 and #7. At KOP #5 the features would begin to attract attention and to dominate the characteristic landscape. At KOPs #6 and #7, structural features (interpretive center, observation tower, and to a lesser extent recreated Indian village) would attract attention and begin to dominate the characteristic landscape; from some vantage points, these features would be difficult to overlook.

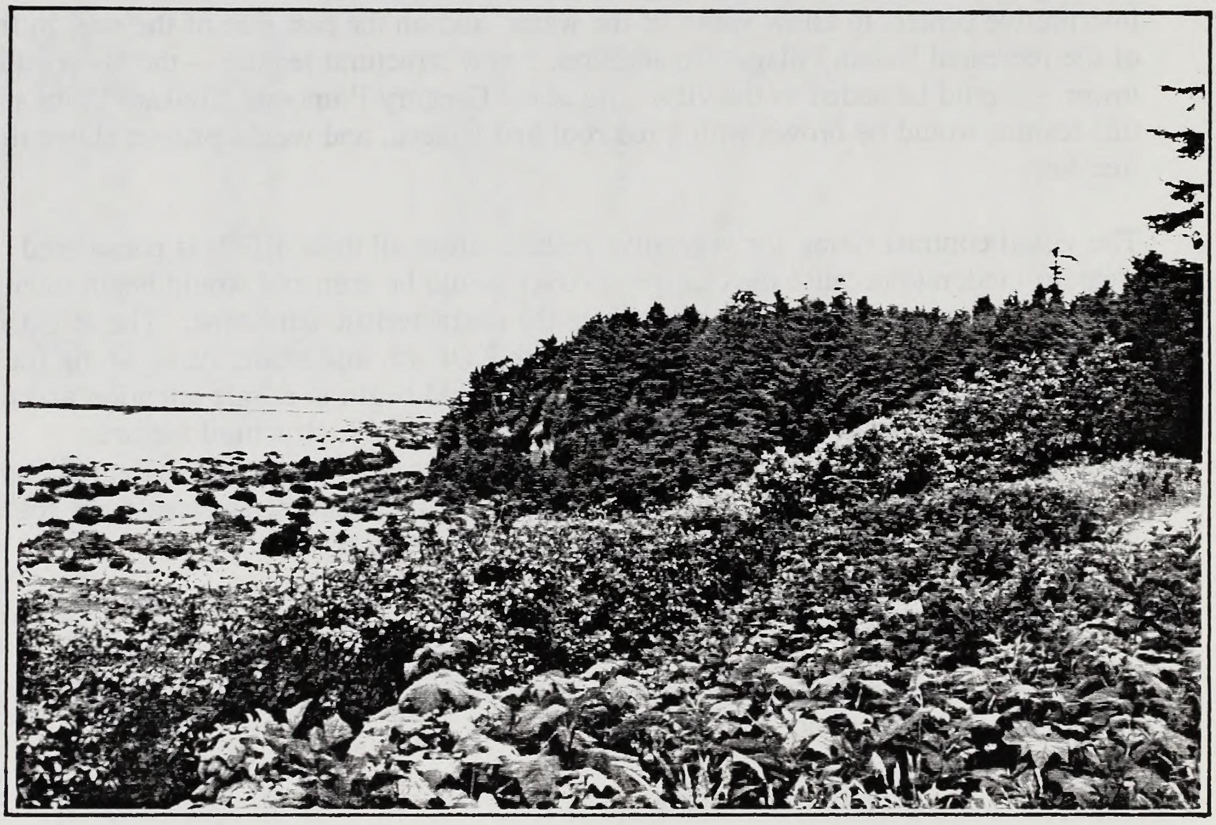
No Action Alternative

With the No Action Alternative, existing views would be maintained and impacts on visual resources would not be expected.

3.2.6.3 Mitigation Measures

Mitigation that would occur at the site chosen for the proposed project would include the following.





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Top photograph (#3) is taken from Bastendorff Beach looking northeast to Coos Head. Bottom photograph (#14) is taken from Bastendorff Beach County Park overlook looking northeast to Coos Head.

FIGURE 17

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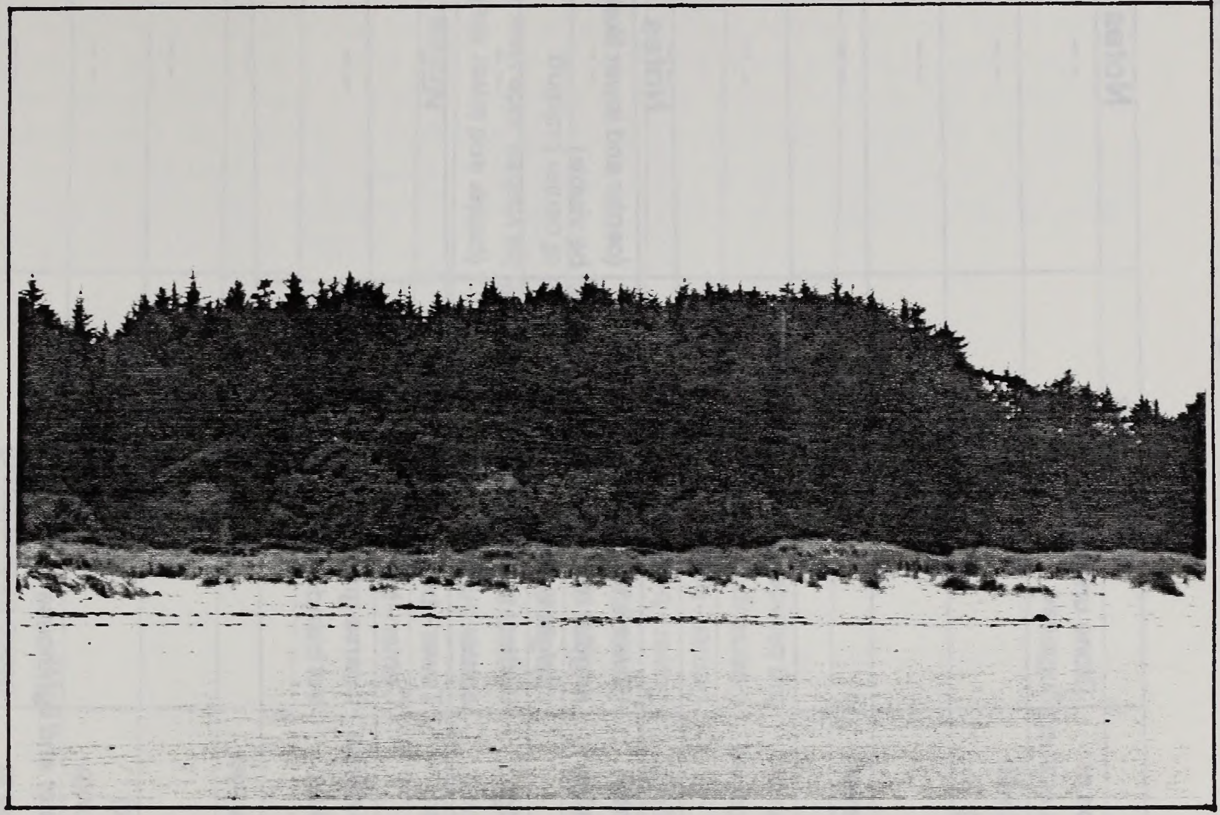

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Photograph (#11) is taken at the north end of Bastendorff Beach looking south to Coos Head.

FIGURE
18

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Table 33. Coos Head – Key Observation Point #5 – Bastendorff Beach (south end) looking northeast (Photo #3)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (beach), rounded and smooth (Coos Head)	Regular with some variation at tree line	(None undeveloped)	--
Line	Horizontal (beach, foredune) and horizontal, sloping (Coos Head)	Regular, mostly horizontal with some individual trees (top)	--	--
Color	Beige to white (beach), spots of brown (bluff)	Medium green	--	--
Texture	Smooth (beach) to medium (vegetation on hillside)	Medium with dense tree cover	--	--

Project	Land/Water	Vegetation	Structures	Notes
Form	--	(Clearing for view from center) linear form created by clearing edge	(tower and center) geometric, angular tower and center building; straight on view	(center and tower likely would be visible)
Line	--	Irregular line created by edge effect on clearing	Vertical tower and lower horizontal center building	--
Color	--	Medium green trees, lighter green lawn	Tower–brown with red roof; Center–brown	--
Texture	--	Patchy effect added where dense cover now unbroken; medium grain	Coarse grain and moderate size, but blended with surroundings	--

Contrast:

Land/Water: None
Vegetation: Weak to moderate
Structure: Moderate

* Substantial clearing on west side of site to provide view of water and lighthouse

Table 34. Coos Head – Key Observation Point #6 – Bastendorff Beach County Park Overlook looking northeast (Photo #14)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (beach), rounded and smooth (Coos Head)	Regular with some variation at tree line	(None undeveloped)	--
Line	Horizontal (tree line) and vertical (bluff edge)	Regular mostly horizontal with some individual trees (tops)	--	--
Color	Beige (sand), spots of brown (bluff)	Medium green	--	--
Texture	Smooth (beach) to medium/ coarse (vegetation on hillside)	Medium coarse with dense tree cover	--	--

Project	Land/Water	Vegetation	Structures	Notes
Form	--	(clearing for view) Linear form created by clearing edge	(tower and center) Geometric, angular tower and center building; side view	(center and tower likely would be visible), side view north end of center building
Line	--	Irregular line created by edge effect of clearing	Vertical tower and lower horizontal center building	--
Color	--	Medium green trees and lighter green lawn	Tower–brown with red roof; Center–brown	--
Texture	--	Patch effect added where dense cover now unbroken; medium green	Coarse grain and moderate size; but blended with surroundings	--

Contrast:
Land/Water: None
Vegetation: Weak to moderate
Structure: Moderate to strong

* Substantial clearing on west side of site to provide view of water and lighthouse

Table 35. Coos Head – Key Observation Point #7 – Bastendorff Beach (north end) looking south (Photo #11)

Existing	Land/Water	Vegetation	Structures	Notes
Form	Flat (beach), rounded and smooth (Coos Head)	Regular to rounded with some variation at tree line	(None undeveloped)	– –
Line	Horizontal (beach, tree line)	Regular, mostly horizontal with some undulation and tree tops	– –	– –
Color	Beige (sand); one brown spot of bluff visible	Medium green	– –	– –
Texture	Smooth (beach) to medium (vegetation on hillside)	Medium coarse with dense tree cover	– –	– –

Project	Land/Water	Vegetation	Structures	Notes
Form	– –	(Clearing for view) Linear form created by clearing edge	(Tower and center) Geometric, angular tower and center building; side view	Center and tower likely would be visible, side view north end of center building
Line	– –	Irregular line created by edge effect of clearing	Vertical tower and lower horizontal center building	– –
Color	– –	Medium green trees; lighter green lawn	Tower–brown with red roof; Center–brown	– –
Texture	– –	Patchy effect added where dense cover now unbroken medium grain	Coarse grain and moderate size; but blended with surroundings	– –

Contrast: Land/Water: None
Vegetation: Weak to moderate
Structure: Moderate to strong

* Substantial clearing on west side of site to provide view of water and lighthouse

Under all alternatives, existing vegetation throughout the site would be maintained where possible to take advantage of natural screens and a landscaping plan would be prepared. The interpretive center would be located away from prominent headlands and the design would blend in with existing topographic forms in shape and placement. Surface features and painting of buildings would minimize contrast with the site and blend in with the land. Maintaining existing vegetation between the Cape Arago Highway and proposed structures at each site would screen new facilities and eliminate any impacts on views for drivers on the highway.

Gregory Point

Project features that would minimize visual impacts include locating structures away from the headland, providing landscaping, and providing a minimum 100-foot buffer between the proposed buildings and privately-owned residences on the bluff above Lighthouse Beach. Viewing opportunities for the public would be increased by providing access to views of the Cape Arago Lighthouse.

Additional measures that are recommended reduce the effect of the proposed observation tower on views from locations both to the north and south would be to change the roof color from red to brown, which would blend with surrounding tree tops, and to not include a lantern in the tower or limit times when the lantern is lit.

Yoakam Point

Project features that would minimize visual impacts include locating structures away from exposed headlands at Yoakam Point and providing vegetative buffers that would reduce impacts on views from Bastendorff Beach, Coos Head, and Bastendorff Beach County Park to the northeast, and from Lighthouse Beach and Gregory Point to the southwest. The height, size, and scale of structures would be compatible with the existing topography. For those residences immediately adjacent to Yoakam Point, a minimum 150-foot buffer would screen the parking area and a minimum 500-foot buffer would screen the interpretive center.

Additional measures that are recommended to reduce the effect of the observation tower on views would be the same as those described for the Gregory Point site.

Coos Head

Project features that would minimize visual impacts include locating structures away from steep bluffs and providing vegetative buffers that would reduce impacts on views from Bastendorff Beach. The height, size, and scale of structures would be compatible with the existing topography. For those residences immediately adjacent to Coos Head to the south, a minimum 150-foot buffer would screen the parking area and interpretive center.

Additional measures that are recommended to reduce the effect of the observation tower on views would be the same as those described for the Gregory Point and Yoakam Point sites.

No Action Alternative

Because there would be no impacts on visual resources under this alternative, no mitigation would be necessary.

3.2.7 INFRASTRUCTURE

3.2.7.1 Water

Affected Environment

Regional

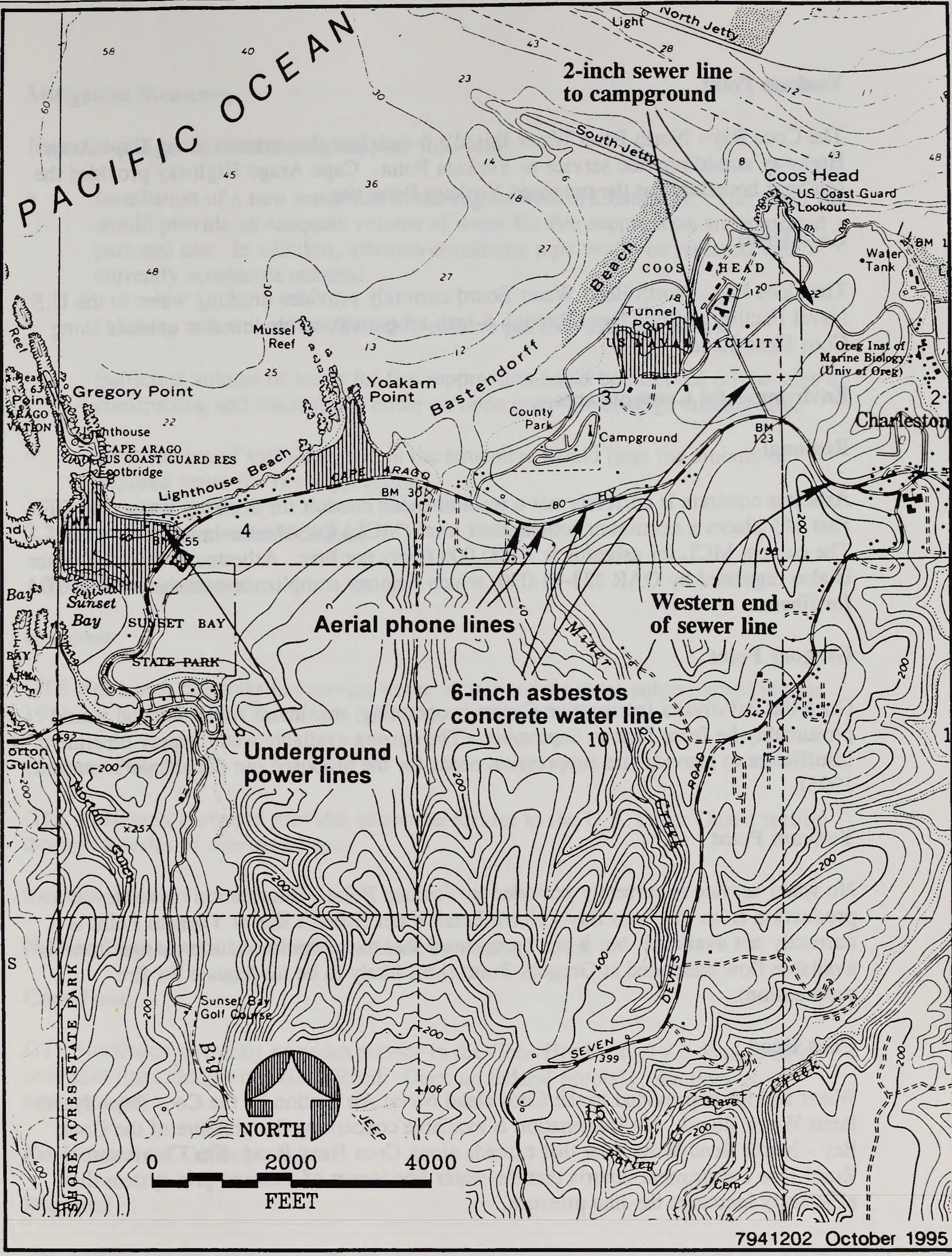
The Coos Bay - North Bend Water Board currently provides drinking water to the region west of Charleston (Figure 19). Some landowners have placed water wells on their property in order to obtain a source of drinking water.

Gregory Point

The Coos Bay - North Bend Water Board currently provides drinking water to the U.S. Coast Guard facility at Gregory Point. The utility has a 6-inch asbestos concrete water line that extends along the Cape Arago Highway. The water flow is very low at the Gregory Point Coast Guard facility with a 1970 flow test showing that the line's capacity could produce 370 gallons per minute (gpm) with 20 pounds per square inch (psi) residual at a hydrant. A second flow test was conducted in June 1995 at the hydrant near the intersection of Cape Arago Highway and Lighthouse Way. The flow test was conducted in two parts; with the Bastendorff Pump Station on and with the Bastendorff Pump Station off. The test results were as follows (R. Hoffine, pers. comm., 1995):

- 400 gpm at 20 psi residual with the Bastendorff Pump Station on;
- 350 gpm at 20 psi residual with the Bastendorff Pump Station off; and
- A static pressure of 80 psi with the Bastendorff Pump Station off.

These flow rates are deficient considering existing fire fighting needs. The Coos Bay - North Bend Water Board reportedly does not plan a system upgrade. However, the utility's 5-year Capital Improvement Plan is due in 1996.



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Utility infrastructure in the area of the proposed Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE 19

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Yoakam Point

The Coos Bay - North Bend Water Board's 6-inch line that extends along Cape Arago Highway would provide service to Yoakam Point. Cape Arago Highway provides the southern boundary for the proposed Yoakam Point site.

Coos Head

The Coos Bay - North Bend Water Board currently provides drinking water to the U.S. Naval Facility at Coos Head through 6-inch asbestos concrete line that extends along Coos Head Road.

Environmental Consequences

Regional

Asbestos concrete is currently not a recommended conduit for drinking water. 40 CFR Part 141 places a maximum contaminant level (MCL) for asbestos in drinking water. The current MCL for asbestos is 7,000,000 fibers per liter. Asbestos in drinking water is also regulated by OAR 333-61-030, which requires compliance with the same MCL for fibers.

Gregory Point

Once the Bal'diyaka Interpretive Center is operating, maximum water demand would presumably be from June to September. The current available water supply pipeline is insufficient to provide fire suppression needs for the proposed use (Groff, pers. comm., 1995).

Yoakam Point

No water service is currently provided to Yoakam Point. Information on water production from the Coos Bay - North Bend Water Board's line at Yoakam Point is currently not available, but it can be assumed that there would be little change from the available flow measured at Gregory Point (i.e., likely to be inadequate for fire suppression).

Coos Head

Water service is provided to the Coos Head Naval Air Station by the Coos Bay - North Bend Water Board. No information is available concerning the pressure of the Coos Bay - North Bend Water line that extends along Coos Head Road. The Charleston Rural Fire Department reports that the water line is part of a closed-grid system that efficiently increases the line pressure.

Mitigation Measures

Potential mitigation measures include the following:

- Installation of a new water line to the region west of Charleston. The water line would provide an adequate volume of water for fire suppression and expected personal use. In addition, asbestos-containing pipe would be replaced with a currently acceptable material.
- Drinking water could be filtered to remove possible asbestos fibers.
- Sufficient volume of water for fire suppression could be reserved on the sites by constructing and maintaining either an open reservoir or large holding tank.
- Construction of sprinklers within the structures would limit the amount of required water for fire suppression.

3.2.7.2 Telecommunications

Affected Environment

Regional

GTE Northwest currently has service in the vicinity of the three subject sites (Figure 19).

Gregory Point

GTE Northwest currently provides telephone service to the U.S. Coast Guard facility through a series of overhead lines.

Yoakam Point

No telephone service is currently provided to Yoakam Point.

Coos Head

GTE Northwest currently provides service to the Coos Head Naval Air Station using overhead lines along Coos Head Road. Once on federal property, the lines go underground.

Environmental Consequences

Regional

The current service capacity of the existing overhead lines may not be sufficient to handle an interpretive center load. However, it is GTE Northwest's responsibility to provide a system that would handle the load. GTE Northwest requests that they be informed of the forecast for the number of needed lines.

Yoakam Point

The overhead GTE Northwest telephone lines would provide service to a Yoakam Point site via existing corridors along Cape Arago Highway.

Mitigation Measures

A 4-inch polyvinyl chloride (PVC) line would be required to extend from the Cape Arago Highway to the terminus point within the interpretive center. The 4-inch PVC line would be buried at a shallow depth. No other mitigation measures are currently anticipated.

3.2.7.3 Electrical

Regional

Pacific Power, a division of PacifiCorp, provides service in the vicinity of the three project sites (Figure 19).

Gregory Point

Pacific Power currently provides electrical service to the U.S. Coast Guard facility. This existing electrical service is overhead along the public right-of-way and is routed underground on the Coast Guard site.

Yoakam Point

No electrical service is provided to this site.

Coos Head

Pacific Power currently provides service to the Coos Head Naval Air Station using overhead lines along Coos Head Road. Once on federal property the lines go underground.

Environmental Consequences

Regional

According to Pacific Power, their existing service is likely to be capable of handling the increased load demand of the proposed Interpretive center. The overhead Pacific Power electrical lines would also provide service to a Yoakam Point site via existing corridors along Cape Arago Highway.

Yoakam Point

The overhead Pacific Power lines would provide service to a Yoakam Point site via existing corridors along Cape Arago Highway.

Coos Head

The overhead Pacific Power lines would provide service to a Coos Head site via existing corridors along Cape Arago Highway.

Mitigation Measures

No mitigation measures are currently anticipated.

3.2.7.4 Sanitary Sewer

Affected Environment

Regional

Coos County reportedly does not have facilities in the vicinity of two of the three proposed sites. The Charleston Sanitary District's service does not extend beyond the intersection of Cape Arago Highway and the Seven Devils Highway, just west of Charleston (Figure 19). Another line, serving Coos County's Bastendorff Beach County Park and the Oregon Air National Guard Base, passes near the Coos Head site. Sewer enhancement for the region west of Charleston is necessary (Whitaker, pers. comm., 1995). The need for the sewer enhancement was firmly established but the issues of timing and financing were not resolved at a regional planning meeting held on June 8, 1995.

No formal sewer moratorium exists, although the Charleston Sanitary District is experiencing some problems (Evernden, pers. comm., 1995). The Coos County code states that an extension of sewers beyond the Urban Growth Boundary is permitted for publicly owned parks, but not for more developments like subdivisions and commercial uses. The interpretive center is not a use that is specified as permitted or not permitted, although an interpretive center is closer to a publicly owned park than to other more intense uses. Additional coordination with Coos County would be necessary.

Individual residences in the area are reportedly on septic systems. There currently are no county ordinances or goals restricting the placement of septic systems in areas suitable for such systems.

The Oregon Parks, located south of Gregory Point, currently has a separate system that was placed into service in 1974. The Oregon Parks sewage treatment system is located just east of the U.S. Coast Guard facility. According to the Park Ranger for the Sunset

Bay State Park, the state is currently interested in enhancement of the sewage treatment services for the area. This enhancement involves the extension of a sewer line and services to the state parks.

Gregory Point

The U.S. Coast Guard facility currently has its own sewage-treating, sand filter system. The system was recently upgraded after the failure of an earlier sewage system. The system is designed for low capacity use and is not sufficient for an interpretive center (Cline, pers. comm., 1995).

Yoakam Point

No sanitary services are currently provided for Yoakam Point.

Coos Head

The Coos Head Naval Air Station is currently serviced by the Charleston Sanitary District. A 2-inch line serves Bastendorff Beach and transports the sewage to the Coast Guard Station; another 2-inch line transports the sewage to the District's treatment facility.

Environmental Consequences

The suitability for a septic system is decided on a case-by-case basis. Marine terraces can be poor sites for septic systems due to either a high water table or very porous sandy material. If sufficient silt is in the terrace deposits and the seasonal high groundwater elevation is low enough, the marine terraces may be suitable for septic systems.

Mitigation Measures

Potential mitigation measures include the following:

- Installation of a new sanitary sewer line in the region west of Charleston.
- Attach to and upgrade Oregon State Park's sewage treatment system at Sunset Bay State Park.

3.2.7.5 Natural Gas

Affected Environment

There currently are no natural gas utilities on the southern coast of Oregon. The predominant sources of fuel for the region are propane, wood, and electricity (Groff, pers. comm., 1995).

Environmental Consequences

The increased combustion of wood fuel would decrease the air quality in the vicinity of the proposed sites (see Air Quality section, 3.1.9 earlier in this EIS).

Mitigation Measures

Propane fuel or electricity could be used for fuel needs.

3.2.7.6 Solid Waste

Affected Environment

The region is not serviced by a centralized municipal solid waste removal service provider. Solid waste is removed on a contract basis.

Environmental Consequences

Solid waste disposal would need to be contracted for offsite disposal.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

Mitigation Measures

No mitigation alternatives are anticipated.

3.2.8 ACCESS

3.2.8.1 Project Site Access

These sites are at Coos Head, Yoakam Point and Gregory Point. Preliminary site layouts show the Yoakam Point and Gregory Point sites could be accessed by the highway directly, while the Coos Head site could be accessed by Coos Head Road.

3.2.8.2 Analysis Methodology

The traffic impact analysis was performed for a full development occurring in the year 2000 with an annual visitor count of 266,000. The design period for the analysis was a Saturday midday peak hour during the summer - typically a weekend during July or August. This period was chosen because it is when the center would have the biggest impact on the adjacent roadway system, hence the period when the greatest effect will be felt.

3.2.8.3 Background Conditions

Cape Arago Highway in the site vicinity is a two-lane state highway with a posted speed of 45 mph. The highway begins at Highway 101 in North Bend, and extends 14 miles to the southwest, terminating at Cape Arago south of Charleston. The approximate design capacity of a roadway facility of this type is 500 vehicles per hour per direction.

Traffic volumes for a number of locations along the Cape Arago Highway were obtained from ODOT representing March 1992 conditions. These volumes were factored to reflect peak summer conditions for 1992. Traffic volumes obtained from permanent recorder 06-004 on Highway 101 south of Bandon revealed that Saturday traffic volumes in August are approximately 36% higher than during March. Highway 101 can be considered a similar facility to Cape Arago Highway, highly subject to recreational traffic. The factored volumes are shown in Table 36. Also shown in Table 36 are the peak summer average daily volumes computed for the year 2000. These volumes were calculated by applying a 1.5% compound annual growth factor, which was developed after considering growth in traffic volumes on the Cape Arago Highway, State Park visitor counts, and traffic in the Coos Bay Area.

Although there are currently three potential locations for the center, this analysis considered the northern and southern locations. The major difference between the two is the background highway traffic volumes, which decrease as one travels toward the dead-end point of the highway at Cape Arago, and that the Coos Head site gains access to the highway via Coos Head Road, whereas the Gregory Point site has a direct access point on the highway. Traffic impacts at the Yoakam Point location (which also has direct access to the highway) can be inferred from conditions at the two locations reported here.

Existing Daily Traffic Volumes

As shown in Table 36, 1992 peak summer traffic volumes on Cape Arago Highway were between 2,240 average daily traffic (ADT) north of Coos Head Road, and 1,200 north of Gregory Point Lighthouse. By 2000, the corresponding volumes are expected to increase to 2,525 and 1,350 ADT, respectively. The volumes in both 1992 and in 2000 indicate very good level of service conditions, with capacity for significant additional traffic on this section of the highway.

Table 36. Background Traffic Volumes

	North of Coos Head Road		North of Gregory Point	
March 1992 Count (ADT)	1,650		880	
1992 Peak Summer ADT*	2,240		1,200	
2000 Peak Summer ADT	2,525		1,350	
2000 Saturday Midday Peak Hour	305		160	
Direction of Travel	Northbound	Southbound	Northbound	Southbound
Vehicles	105	200	55	105
Directional split	35%	65%	35%	65%

* *Based on information from Bandon permanent recorder.*

Background Level of Service

LOS is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various LOS from A to F (Tables 37 and 38).

Table 37. General Level of Service Descriptions - Unsignalized

Level of Service	General Description
A	Nearly all drivers find freedom of operation. Very seldom is there more than one vehicle in the queue.
B	Some drivers begin to consider the delay an inconvenience. Occasionally there is more than one vehicle in the queue.
C	Many times there is more than one vehicle in the queue. Most drivers feel restricted, but not objectionably so.

D	Often there is more than one vehicle in the queue. Drivers feel quite restricted.
E	Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. There is almost always more than one vehicle in the queue. Drivers find the delays to be approaching intolerable levels.
F	Forced flow. Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table 38. Level of Service Criteria - Unsignalized Intersections

Reserve Capacity (pcph)	Level of Service	Expected Delay to Minor Street Traffic
≥400	A	Little or no delay
300-399	B	Short traffic delays
200-299	C	Average traffic delays
100-199	D	Long traffic delays
0-99	E	Very long traffic delays
*	F	*

The reserve capacity concept applies only to an individual traffic movement or to shared-lane movements. Once the capacity of all the individual movements has been calculated and their LOS and expected delays determined, an overall evaluation of the intersection can be made. Normally, the movement having the worst LOS defines the overall evaluation, but this may be tempered by engineering judgment. A LOS E is generally considered to represent the minimum acceptable design standard.

It should be noted that the Draft Traffic Impact Study guidelines in the *Highway Capacity Manual* (Transportation Research Board, 1994) have differing levels of LOS for the minimum acceptable design standard for all intersections (both signalized and unsignalized) depending upon the relative contribution of project traffic to the signal warrant.

Past experience with the unsignalized analysis procedure indicates this methodology is very conservative in that it tends to overestimate the magnitude of any potential problems that may exist. This is especially true for minor street, left-turn movements. For example, the *Highway Capacity Manual* (Transportation Research Board, 1994) methodology does not take into account the effects of vehicle flow platoons that result from upstream signalization. Vehicles traveling in platoons tend to create greater gaps in the traffic flow, which sometimes provides additional capacity for the side closest to the signal. Therefore, the results of any unsignalized intersection analysis should be reviewed taking this into consideration. Generally, LOS E for the minor street, left-turn movement is considered to be acceptable for an unsignalized intersection, although it also indicates that the need for signalization should be investigated.

Based on the data in Table 37, peak hour level of service (LOS) was calculated for a Saturday midday peak hour for the year 2000. The results of this analysis are shown in Table 39.

Table 39. 2000 Saturday Midday Peak Hour Level of Service

Intersection	LOS	Reserve Capacity
Coos Head Rd and Cape Arago Highway	A	650
Lighthouse Way and Cape Arago Highway	A	860

The LOS results shown in Table 39 indicate that background conditions in 2000 are expected to be good with unsignalized roadway intersections on the highway operating at LOS A, with ample reserve capacity.

3.2.8.4 Traffic Impact Analysis

The traffic analysis performed to estimate the impacts of the proposed development on conditions on the Cape Arago Highway is based on projected visitor information supplied by Dean Runyan Associates (1995). It was assumed that 65% of the daily attendance would occur during the peak four-hour period between 11:00 am and 3:00 pm. Further, it was assumed that 30% of the peak period attendance would occur during the peak one hour (12:00 to 1:00 pm). The hours of operation of the interpretive center are likely to be 9:00 am to 6:00 pm during the summer and 10:00 am to 5:00 pm during other seasons.

The average length of stay was assumed to be one hour, which would indicate that the split of arriving to departing visitors should be roughly equal. The inbound/outbound split was assumed to be 55% to 45%.

Table 40. Visitor and Vehicle Volumes

	# of Visitors	# of Vehicle Trips*	
Design Day Visitors (weekend)	2,863	1,920	
Peak period (11 - 3) (65%)	1,860	1,250	
Peak Hour (12 - 1) (30%)	560	375	
Directional Split		In 55%	Out 45%
Peak Hour Visitor Traffic		205	170

* Two-way Trips

During a peak summer weekend day there would be an expected 961 vehicle visits. This translates to 1,920 new vehicle trips on Cape Arago Highway as indicated in Table 40. This represents a very conservative estimate, as the analysis assumes all trips to the interpretive center would be new trips on the highway. In reality, a significant number of the projected visitor trips would be diversions made by people who would already be traveling on the highway to the state parks and/or beaches.

To complete the level of service analysis, traffic generated by the proposed development, as detailed in Table 40, was added to the background traffic assumed for the year 2000 and Saturday midday peak hour LOS was determined, in accordance with the procedures laid out in the *Highway Capacity Manual* (Transportation Research Board, 1994). The results of the LOS calculations are shown in Table 41.

Table 41. **Saturday Midday Peak Hour Level of Service**

	No Action 2000		Build 2000	
Intersection	**LOS**	**Reserve Capacity**	**LOS**	**Reserve Capacity**
Coos Head Road and Cape Arago Highway	A	650	B	345
Lighthouse Way and Cape Arago Highway	A	860	A	475

Gregory Point

In the year 2000, daily traffic on Cape Arago Highway would increase 140% compared to the No Action Alternative. While this is a substantial increase in volume, the LOS remains a LOS A, which indicates little or no change in perceived traffic performance.

Yoakam Point

The traffic impacts on Cape Arago Highway, as a result of development of the interpretive center at Yoakam Point, are the same as those for Gregory Point.

Coos Head

Development of the interpretive center at Coos Head would result in a 75% increase in traffic volume as compared to the No Action Alternative, and a slight decrease in performance to LOS B. LOS B indicates that short delays at the intersection of Coos Head Road and Cape Arago Highway can be expected.

No Action Alternative

Under this alternative, traffic volumes are expected to increase at an average of 1.5% per year. Traffic performance will remain at LOS A.

3.2.8.5 Mitigation Measures

Analysis of the daily and weekend midday peak hour traffic impacts that could be expected from the development of the proposed Bal'diyaka Interpretive Center on the Cape Arago Highway indicates that, while there would be a large proportional increase in traffic on the highway, there would be no associated traffic operations impacts requiring intersection or highway mitigation.

3.2.8.6 Site Access Considerations

The proposed location of the interpretive center to the west of the highway means that the majority of entering vehicles would be making a right turn from the highway into the site, minimizing impacts on highway traffic. Outbound traffic, the majority of which would make a left turn to head north on the highway, would wait within the site driveway for an opportunity to enter the highway, and thus would not affect traffic using the highway. Although site driveway layouts have not been finalized, the following points would apply:

- There is no need for a left-turn pocket for the northbound vehicles entering the site because of very low demand.
- A deceleration/right-turn lane for southbound traffic, while not being necessary, would benefit safety and operation on the highway, and for traffic entering the site.
- The access driveway should be designed to ensure safe and convenient access for recreation vehicles as well as delivery vehicles serving the center.
- The driveway throat should provide 75 feet of storage for exiting vehicles.
- Sight distance of 450 feet in each direction should be provided at the site driveway to allow exiting vehicles to see on-coming vehicles on the highway.
- Signing should be provided in advance of the site as well as at the entrance.

3.2.9 NOISE

3.2.9.1 Affected Environment

Background Information

Sound is created when objects vibrate, resulting in a minute variation in surrounding atmospheric pressure called sound pressure. The human response to sound depends on the magnitude of a sound as a function of its frequency and time pattern (U.S. EPA, 1974). Magnitude describes the physical sound in the air. The range of magnitude from the faintest to the loudest sound the ear can hear is so large that sound pressure is expressed on a logarithmic scale in units called decibels (dB).

Humans respond to a sound's frequency or pitch. Environmental noise is composed of many frequencies, each occurring simultaneously at its own sound pressure level. As measured by an electronic sound level meter, frequency weighting combines the overall sound frequency into one sound level. The frequency weighting commonly used for environmental noise is A-weighting (dBA), which simulates how an average person hears sounds.

Sound pressure levels vary by activity. Some examples of typical sound pressure levels are: 120 dBA for a jet airplane taking off at a distance of 200 feet; 110 dBA for construction noise at 10 feet; 90 dBA for a logging truck at 50 feet; 70 dBA for busy traffic at 50 feet; and 60 dBA for normal conversation at 3 feet (Tipler, 1976).

Environmental noise fluctuates considerably, and the time pattern of a sound affects human response. The time-varying levels of noise an individual person experiences are related to noise exposure. Noise exposure is the cumulative distribution of sounds over a specified time period.

Loudness, compared to physical sound measurement, refers to how people subjectively judge a sound and varies from person to person. In general, an increase in noise level from 1 to 3 dBA would not be noticeable, 3 to 5 dBA would be noticeable to most people, 5 to 7 dBA would be easily heard, and 7 to 10 dBA would be judged as substantial.

Because of the logarithmic decibel scale, a doubling of the number of noise sources, such as traffic volume, increases noise levels by 3 dBA. A 10-fold increase in the number of noise sources would add 10 dBA.

To combine the noise levels in decibels from several different sources, the decibel readings are not added directly, but are combined on an energy basis. For example, a noise source emitting a noise level of 60 dBA combined with another noise source of 60 dBA yields a combined noise level of 63 dBA, not 120 dBA.

Noise levels from traffic depend on volume, speed, and the type of vehicles. Generally, an increase in volume, speed, or percentage of trucks would increase traffic noise levels. For a line source such as a roadway, noise levels would decrease 3 dBA over hard ground (concrete, pavement) or 4.5 dBA over soft ground (grass) for every doubling of distance between the roadway and receptor. For a point source such as stationary construction equipment, noise levels would decrease 6 dBA for every doubling of distance.

Environmental noise commonly is expressed as the equivalent sound level (Leq), which can be considered the average noise level. Leq places more emphasis on occasional high noise levels that accompany general background noise levels. Leq measured over a one-hour period is the hourly Leq (Leq(h)), which the FHWA uses for highway noise impact and abatement analyses.

The instantaneous, maximum noise level that can occur during any period of time is called the Lmax. Unlike the Leq noise level that is an average over a period of time, Lmax is a measurement of a single event of short duration. Lmax is related to impacts on speech interference and sleep disruption.

Noise Criteria and Regulations

Applicable noise regulations and guidelines provide a basis for evaluating potential noise impacts. For federally funded highway projects, traffic noise impacts occur when predicted Leq(h) noise levels approach or exceed noise abatement criteria as established by the Federal Highway Administration (FHWA), or substantially exceed existing noise levels (U.S. Department of Transportation, 1982). For residences, parks, schools, churches, and similar areas, the noise criterion is 67 dBA. The Oregon Department of Transportation (ODOT) uses the same criteria. ODOT considers a noise impact to occur if predicted Leq(h) noise levels reach or exceed the FHWA noise abatement criteria for the particular land use. Thus, if a noise level were 67 dBA or higher in a residential area, it would reach or exceed the FHWA noise abatement criterion of 67 dBA for that particular land use. FHWA regulations also specify that traffic noise impacts occur when predicted noise levels substantially exceed existing noise levels, although "substantially exceed" is not defined. ODOT considers an increase of 10 dBA or greater to be a substantial increase. Local jurisdictions typically informally adopt FHWA's noise criteria and apply them to projects under their jurisdiction during environmental review.

Construction noise is exempt from the Oregon Department of Environmental Quality (ODEQ) regulations for industry and commerce (Obteshka, 1995). Coos County does not currently have any noise regulations that apply to construction activities (Kerns, 1995).

Existing Land Use and Noise-Sensitive Areas

The Gregory Point site currently is partially undeveloped, with U.S. Coast Guard facilities located on the point and the Cape Arago Lighthouse located on Chief's Island. The site is adjacent to residential uses on the east and Sunset Bay State Park on the west (see Figure 2). There are 15 residences to the east, within 2,000 feet of the site boundary, and the nearest residence is about 350 feet from the proposed parking area. With the exception of normal residential background noise such as automobiles, maintenance activities like lawn mowing, and children, there are no existing sources of noise in the area. Noise levels are quiet and typical of those found in rural areas.

The Yoakam Point site currently is undeveloped and is adjacent to residential use and the Bastendorff Beach Community Park (see Figure 3). There are three residences close to the west property boundary, within 200 feet of the proposed parking area, and ten residences within 600 feet of the site boundary. Beside normal residential background noise, there are no existing sources of noise in the area. General noise levels are typical of those found in rural areas.

The Coos Head site currently is undeveloped and is adjacent to residential uses to the south, the U.S. Air Station to the east, and Bastendorff Beach to the west and north (see Figure 4). There are approximately four residences to the south of the site, with the nearest residence about 150 feet from the proposed parking area. With the exception of normal residential background noise, there are no existing sources of noise in the area. Noise levels are quiet and typical of those found in rural areas.

3.2.9.2 Environmental Consequences

Gregory Point

Construction Noise. Construction activities would generate noise during the construction period. Construction usually would be carried out in phases, each of which has its own mix of equipment and, consequently, its own noise characteristics. Building construction phases could include clearing, excavating, placing foundations, erecting structures, and finishing buildings. The initial ground clearing and excavation phases tend to be the noisiest, with subsequent foundation and erection phases being somewhat less noisy, and the final finishing phase being quieter but still loud enough to be considered annoying.

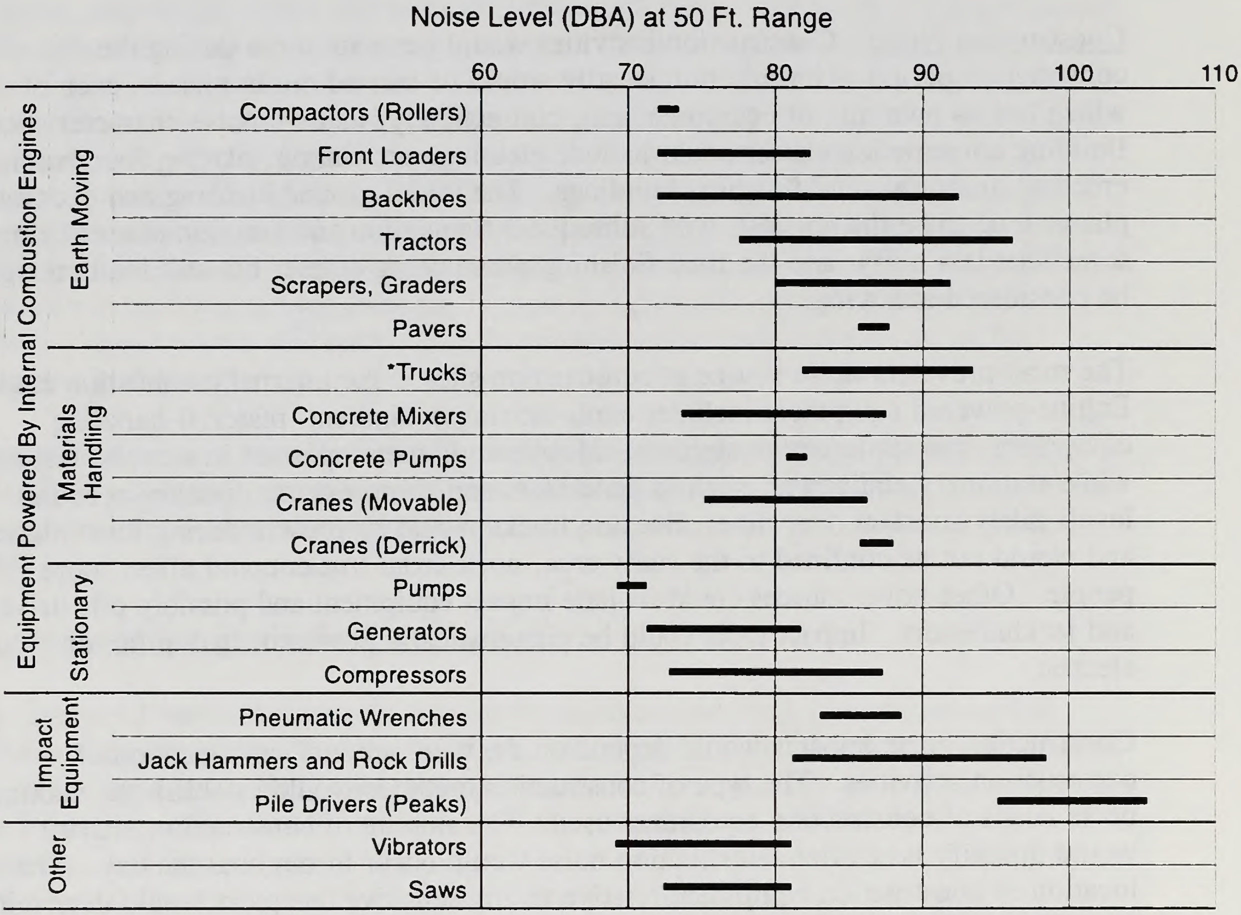
The most prevalent noise source at construction sites is the internal combustion engine. Engine-powered equipment includes earth-moving equipment, material-handling equipment, and stationary equipment. Mobile equipment operates in a cyclic fashion, while stationary equipment, such as generators and compressors, operates at sound levels fairly constant over time. Because trucks would be present during most phases and would not be confined to the study area, noise from trucks could affect more people. Other noise sources could include impact equipment and possibly pile drivers and jackhammers. Impact tools could be pneumatically powered, hydraulic, or electric.

Construction noise impacts would depend on the type, amount, and location of construction activities. The type of construction methods would establish the maximum noise levels of construction equipment used. The amount of construction activity would quantify how often construction noise would occur throughout the day. The location of construction equipment relative to any sensitive receptors would determine any effects of distance in reducing construction noise levels.

During construction, noise levels would increase at sensitive receptors near construction sites. Residential sensitive receptors are located within 200 feet of the project site; there are also existing public use areas and parks throughout the study area.

Maximum noise levels of construction equipment throughout the study area would be similar to typical maximum construction equipment noise levels presented in Figure 20. As shown in Figure 20, maximum noise levels from construction equipment would range from 69 to 106 dBA at 50 feet. Construction noise at sensitive receptors farther away would decrease at a rate of 6 dBA per doubling of distance from the source. Extrapolating from Figure 20, maximum noise levels at 200 feet would range from 57 to 94 dBA from a single piece of construction equipment. Noise levels could be higher depending upon the amount of construction equipment used and their relation to one another. Because various equipment would be turned off, idling, or operating at full

Construction Equipment Noise Ranges



* Current measurements indicate truck noise level of 78-90

NOTE: Based on limited available data samples.

SOURCE: U.S. Environmental Protection Agency, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," NTID 300.1, December 31 1971. Revised WSDOT District 1, February, 1991.

Construction equipment noise ranges which may apply during construction of the Bal'diyaka Interpretive Center on Cape Arago Highway in Coos County, Oregon.

FIGURE 20

power at any time, and because shielding would be provided by existing vegetation and buildings, average Leq noise levels during the day would be less than maximum noise levels presented in Figure 20. Construction noise levels would be reduced by the construction practices identified under Mitigation Measures, below.

Operational Noise. At the Gregory Point site, general background noise levels would increase slightly because of activity associated with the new interpretive center. The largest noise level increase would likely be related to increased vehicle trips and parking lot activity. Under the worst-case scenario, traffic levels on Cape Arago Highway may increase up to 140% over their existing volumes (see Section 3.2.8, Access). This would translate to an increase in traffic noise levels by approximately 4 to 5 dBA, which would not be considered an impact. Additionally, traffic noise levels are not expected to reach or exceed 67 dBA on Cape Arago Highway or Gregory Point Road as a result of this alternative. No operational impacts are expected to occur as a result of this alternative.

Yoakam Point

Construction Noise. Because of similarities in size, facilities, and layout to the Gregory Point site, construction activities at the Yoakam Point site are expected to be similar. Construction activities would generate noise during the construction period. Several residences are located less than 200 feet of the project site.

Operational Noise. Noise levels in the vicinity of the Yoakam Point site would increase slightly because of activity associated with the interpretive center. Increased vehicle trips and parking lot activity would account for the largest portion of the increase in noise levels. In the worst case scenario, traffic levels would increase somewhere between 75% and 140% on Cape Arago Highway (see Section 3.2.8, Access). This would translate to an increase in noise levels of approximately 2 to 5 dBA which would not be considered an impact. Furthermore, traffic noise levels are not expected to reach or exceed 67 dBA on Cape Arago Highway as a result of this alternative. No operational impacts are expected to occur as a result of this alternative.

Coos Head

Construction Noise. Because of similarities in size, facilities, and layout to the Gregory Point and Yoakam Point sites, construction activities at the Coos Head site are expected to be similar. A few residences are located less than 200 feet of the project site, and would be exposed to noise during the construction period of the project.

Operational Noise. At the Coos Head site, general background noise levels would increase slightly because of activity associated with the development; the largest noise level increase would likely be related to parking lot activity and increased vehicle trips. In a conservative worst case scenario, traffic levels are projected to increase 75% (see Section 3.2.8, Access). This would translate to an increase in traffic noise levels of approximately 2 to 3 dBA, which would not be considered an impact. Furthermore, traffic noise levels are not expected to exceed 67 dBA on Cape Arago Highway or Coos Head Road as a result of the project. No operational impacts are expected as a result of this alternative.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.9.3 Mitigation Measures

All Alternatives

Noise can be controlled at three locations: (1) at the source, such as with mufflers and quieter engines; (2) between the source and receptor, with barriers; and (3) at the receptor, with insulation. Primary consideration is generally given to abating noise in exterior areas.

Construction Noise. Construction noise could be reduced by using enclosures or walls, installing mufflers on engines, substituting quieter equipment or construction methods, minimizing time of operation, and locating equipment farther from sensitive receptors. To reduce construction noise at nearby sensitive receptors, mitigation measures would be incorporated into construction plans and contractor specifications. Mitigation measures that have been identified include the following:

- Limiting noisier construction and demolition activities to between 7 a.m. and 6 p.m., which would reduce the amount of annoyance for residents near construction sites during sensitive nighttime hours.
- Shielding noisy equipment with acoustic barriers, which would reduce noise levels from construction equipment.
- Equipping construction equipment engines with adequate mufflers, intake silencers, and engine enclosures, which would reduce their noise by 5 to 10 dBA (U.S. EPA, 1971).
- Specifying the quietest equipment available, which would reduce noise by 5 to 10 dBA.
- Turning off construction equipment during prolonged periods of nonuse, which would eliminate noise from construction equipment during those periods.
- Requiring contractors to maintain all equipment and train their equipment operators, which would reduce noise levels and increase efficiency of operation.
- Locating stationary equipment away from receiving properties, which would decrease noise from that equipment in relation to the increased distance.

Operational Noise. Because no impacts are expected from operation of any of the build alternatives, no mitigation is required or proposed.

3.2.10 HAZARDOUS MATERIALS

3.2.10.1 Affected Environment

Interviews with BLM personnel and U.S. Coast Guard personnel responsible for maintenance and record keeping were held prior to the field investigations. Existing documents pertaining to the three proposed sites were examined. In addition to documents listed under the attached References section, other documents reviewed include site drawings and maps specific to the Cape Arago Coast Guard facilities. Five field visits were made during this investigation.

Gregory Point

The review documents and field reconnaissance resulted in the discovery and confirmation of one underground storage tank (UST) and associated piping at Gregory Point, whose contents and status are unknown. Records show the possible existence of an additional 1,500-gallon UST for heating oil at the housing complex at Gregory Point. No recorded evidence supporting its current status was found.

The Coast Guard has furnished a copy of a report dated 1995 confirming the presence of approximately 800 square feet of cement asbestos board (CAB) in two rooms at the housing complex at Gregory Point. In addition, 1956 site plans reflect the possibility of an underground 3-inch cement-asbestos pipe water-line buried near the housing structure.

Yoakam Point

No evidence of hazardous materials or waste was discovered on Yoakam Point. Minor amounts of garbage were observed in and around the Yoakam Point site, likely from people accessing the beach areas. No environmental abnormalities were found on the site.

Coos Head

No evidence of hazardous materials or waste was discovered on the Coos Head site.

3.2.10.2 Environmental Consequences

Gregory Point

Construction of the interpretive center would involve the removal of the underground storage tank, demolition of the housing units, and potential removal of the water line. Demolition debris containing asbestos would be generated during construction.

The proposed action is unlikely to generate new hazardous materials or wastes that cannot be immediately mitigated upon occurrence (e.g., a minor spill of paint, solvent recycling). Modern construction materials and methodology generally preclude the use or installation of known hazardous substances. Post-construction maintenance activities will be in compliance with applicable laws governing use, storage and disposal of materials such as fuels, paints and chemicals.

Yoakam Point and Coos Head

There will be no hazardous materials impacts as a result of the construction of the interpretive center at either site beyond those addressed under the Gregory Point construction section, above. Operation of the interpretive center would involve maintenance activities, which would be in compliance with applicable regulations governing use, storage, and disposal of materials such as fuels, paints, and chemicals.

No Action Alternative

Under this alternative, no interpretive center would be constructed and no impacts associated with the construction or operation of the center would occur.

3.2.10.3 Mitigation Measures

Gregory Point

Prior to the excavation and removal of the UST, a complete environmental investigation should be conducted to determine if there is any leakage. A detailed mitigation plan will be developed at that time. Abatement of asbestos in the demolition of the housing units and removal of the water-line will follow standard state-regulation procedures.

Mitigation measures listed under Sections 3.1.3 and 3.1.4 will abate hazardous materials impacts and therefore, no additional measures are needed.

Yoakam Point and Coos Head

No mitigation is necessary beyond those items listed under Sections 3.1.3 and 3.1.4.

Sections 4.0-7.0

- Cumulative Impacts
- Adverse Environmental Effects which Cannot be Avoided Should the Action be Implemented
- Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
- Irreversible or Irretrievable Commitments of Resources

4.0 CUMULATIVE IMPACTS

Cumulative impacts are defined as incremental impacts resulting from the proposed action and from other past, present, and reasonably foreseeable future actions that would or could have a greater combined effect over space and time. Existing conditions and direct and indirect impacts are described in Section 3. This section provides an overview of the potential direct and indirect impacts as they occur over time, within the context of impacts that would result from various actions that are unrelated to the proposed interpretive center. None of the cumulative impacts described in this section is considered significant.

Tourism

The southern coast of Oregon is becoming more popular as a tourist destination. Individual attractions in North Bend, Coos Bay, Charleston, and Empire add to tourist activity in the study area. The Bal'diyaka Interpretive Center is expected to be visited by approximately 266,000 people per year. The majority of these people would be visiting other attractions in addition to the interpretive center, but the proposed action would result in increased demand for lodging, food, transportation and retail goods. The total expenditure each year attributable to the proposed action is $4.6 million in sales.

Traffic

Background traffic volume in the study area is growing by an average of 1.5% per year. This growth is due to increased traffic in the Coos Bay area and increased use of the State Park facilities on Cape Arago Highway. The proposed action would result in a substantial increase in traffic volumes, compared to the No Action Alternative, but this would not degrade traffic performance on Cape Arago Highway.

State Parks

The Oregon Parks and Recreation Department is planning to improve the Sunset Bay State Park by developing a new group use area in Norton Gulch (A. LaTomme, pers. comm., 1995) The area would provide a combination shelter/restroom building, camping area, and large open space picnic area. This planned use would increase use of Cape Arago Highway, but the highway has sufficient capacity to allow for the proposed action and this planned group use area.

5.0 ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE ACTION BE IMPLEMENTED

Based upon the analyses conducted in this report, several unavoidable adverse impacts were identified. Other potential impacts were avoided by incorporating changes in the conceptual design layout and mitigation measures.

Impacts with a high likelihood of occurring and that cannot be mitigated include:

- Clearing of approximately five acres of existing vegetation;
- Fragmentation of existing wildlife habitat;
- Increased traffic on Cape Arago Highway; and
- Increased noise during construction.

6.0 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

For an estimated 15 months following site acquisition approximately 5 acres of the total acreage will be used as a construction site. Construction would involve clearing and grubbing, cutting, filling, surfacing, paving, landscaping, fencing, lighting, signing, extension of utilities and erection of structures. The productivity of this land, in terms of its ecological productivity as a wildlife habitat, would be lost for the estimated 15 months of construction time. However, the construction period will also generate new productivity in terms of the new construction jobs created; new payrolls; induced personal income; and purchasing of materials, supplies, and services.

Operation of the proposed facility would have similar, although longer-lasting, productivity impacts. Ecological productivity of the site would be limited throughout the project's life. However, there would be beneficial impact upon local and regional productivity by virtue of the estimated 15 new permanent jobs offered by the facility and its annual operating budget of $425,000. These productivity gains would be, for the most part, long-term given the projected life-span of the facility.

The cumulative effect of construction and operation of the proposed facility would be to stimulate the community and region toward greater lasting productivity in terms of economic output.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction of the proposed facility would result in both direct and indirect commitments of resources. In some cases, the resource committed would be recovered within a relatively short period of time. In others, resources would be irreversibly or irretrievably committed by virtue of being consumed or by the apparent limitlessness of the period of their commitment to a specific use. Irreversible and irretrievable commitments of resources can sometimes be compensated for by the provision of other resources with substantially the same use or value.

Approximately 5 acres of the available site would be required for the actual construction of the proposed facility. This acquisition would be offset by the creation of the interpretive center itself and the societal benefits resulting from such a facility. However, the use of this land should be considered as irretrievably committed.

The proposed project would also require the commitment of various construction materials, including cement, aggregate, steel, wood, and asphalt. Much of the material accumulated for construction may at some time be recycled or used for fill. These construction materials should also however, be viewed as irretrievably committed.

The proposed project would require the use of an amount of fossil fuel, electrical energy, and other resources during construction and operation that cannot be estimated precisely at this time. These should be considered irretrievably committed to the proposed project. In addition, an estimated 146 jobs will be committed to the construction phase of the project and some 15 jobs during the operational phase.

Section 8.0

Consultation and Coordination and Conservation Potential of Various Alternatives and Mitigation Measures

8.0 CONSULTATION AND COORDINATION

8.1 SCOPING

Scoping meetings, designed to elicit public input, were held at two locations: North Bend, Coos County, Oregon; and Eugene, Lane County, Oregon. The scoping meetings were conducted in two sessions at each location, 3 p.m. to 5 p.m. and 7 p.m. to 9 p.m. The meetings were held on January 9, 1995, at the BLM Coos Bay Office in North Bend, and on January 10, 1995, at the BLM Eugene Office. Notice of the meetings was published in the Federal Register on December 19, 1994, and in the *Eugene Register-Guard* and *The World* on December 21, 1994.

The sessions in North Bend were attended by 13 people in the afternoon and 9 people in the evening. No one, except a representative of the Oregon Parks and Recreation Department, who made oral comments at North Bend attended either session in Eugene. In addition to the meetings, written scoping comments were accepted until January 27, 1995. The oral and written comments resulted in identification of 21 alternative sites, including the proposed action. The scoping sessions also identified issues of concern to the public and agencies. These issues included, but were not limited to, the following:

- Potential impacts on rare, threatened or endangered species;
- Potential impacts on adjacent State Parks' facilities;
- Potential impacts on traffic;
- Potential impacts on adjacent properties;
- Potential impacts on fire and emergency responses; and
- Potential impacts on vegetation because of windthrows.

These and other issues are addressed in the analyses in this report.

8.2 AGENCY COORDINATION

On November 29, 1994, the BLM Coos Bay District sent letters to various agencies inquiring if they would like to be "cooperating agencies" in the preparation of the Bal'diyaka Interpretive Center EIS. The following agencies wished to be designated "cooperating agencies:"

- U.S. Coast Guard;
- Oregon Parks and Recreation Department;
- Oregon Department of Fish and Wildlife; and
- Oregon Department of Land Conservation and Development.

The cooperating agencies and agencies who decided not to be designated as such were sent notices regarding the scoping meetings.

The agencies were invited to attend an alternatives analysis meeting, where all the alternatives were discussed and rated. This meeting is described in Section 2.3.

8.3 LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE EIS ARE SENT

U.S. National Park Service
P.O. Box 37127
Washington, DC 20013-7127

U.S. Department of Energy
1000 Independence Avenue S.W.
Washington, DC 20585

Starla Jewell Kelly
National Comm. Education Assn.
801 N. Fairfax, #209
Alexandria, VA 22314

Jean Guana
Southwest Organizing Project
211 10th Street S.W.
Alberquerque, NM 87102

Office of Federal Act. (A-104)
EPA, Room 2119 Mall
Attn: Management Information Unit
401 "M" Street S.W.
Washington, DC 20460

U.S. Fish & Wildlife Service
4401 N. Fairfax Drive
Arlington, VA 22203

U.S. Bureau of Reclamation
Denver Federal Center
P.O. Box 25007
Denver, CO 80225-0007

Leo Bauer
P.O. Box 2153
Gearhart, OR 97138

U.S. Bureau of Mines
MS-5050, Room 819
Washington, DC 20240

U.S. Department of Transportation
Office of Env., Energy & Safety
Room 9217
Washington, DC 20590

David B. Henson
Alabama A & M University
P.O. Box 1357
Normal, AL 35762

Robert B. Tippeconnic
U.S.D.A. Forest Service
P.O. Box 96090
Washington, DC 20090-6090

U.S. Department of Transportation
400 7th Street S.W.
Federal Highway Administration
Washington, DC 20590

U.S. Bureau of Mines
MS-5230
360 E. Third Avenue
Spokane, WA 25086

Ladonna Harris
Americans for Indian Opportunities
681 Juniper Hill Road
Bernalillo, NM 87204

Bob Packwood
U.S. Senate
101 S.W. Main, No. 240
Portland, OR 97204

U.S. Air Force
SAF/MIQ Air Force Pentagon
Washington, DC 20330-1660

U.S. Geological Survey
National Center (423)
Reston, VA 22092

Leonard Dominguez
City Hall
121 N. Lasalle, #507
Chicago, IL 60602

U.S. Air Force
HD USFS/CEVP
1260 Air Force Pentagon
Washington, DC 20330-1260

U.S. Minerals Management Servi
381 Elden Street
Herndon, VA 22070-4817

Diane Dillon-Ridgley
P.O. Box 2982
Iowa City, IA 52233-2942

Margaret H. Boyd
7042 Fernhill Drive
Malibu, CA 90265

David Slusarinko
SMH Partnership
320 S.W. 6th Avenue
Portland, OR 97204

Jim Fessler
Oregon Department of Fish & Wildlife
P.O. Box 59
Portland, OR 97207

Ray Naff
Senator Mark Hatfield's Office
475 Cottage Street N.E.
Salem, OR 97301

Historic Preservation Office
Parks and Recreation Department
525 Trade Street S.E.
Salem, OR 97310

Michael Fried
1939 Cedar Street
Berkely, CA 94709

The Honorable Mark O. Hatfield
U.S. Senate
122 S.W. Salmon, #1420
Portland, OR 97204-2929

Ms. June Boynton
Bureau of Indian Affairs
911 N.E. 11th Avenue
Portland, OR 97232-4169

Earl Perry
3475 W. 16th
Eugene, OR 97402

City of Coos Bay
500 Central
Coos Bay, OR 97420

Claudia Allsup
10632 Lighthouse Way
Coos Bay, OR 97420

Wynelle W. Isaac
12290 N.W. Big Fir Court
Portland, OR 97229

Cam Gilmour
Oregon Department of Transportation
307 Transportation Building
Salem, OR 97310

Oregon Natural Resources Council
ATTN: D. Heiken, S.W. Field Rep.
1551 Oak Street, Suite A
Eugene, OR 97401

Gordon Todd
1208 S.W. Hessler Drive
Portland, OR 97201

U.S. Army Corps of Engineers
North Pacific Division
P.O. Box 2870
Portland, OR 97208

Oregon Economic Development Dept.
775 Summer Street N.E.
Salem, OR 97310

Beth Moore
2434 Columbia Street
Eugene, OR 97403-1778

Coos Bay Public Library
525 W. Anderson
Coos Bay, OR 97420

Lilah Bidwell
933 Fenwick
Coos Bay, OR 97420

Eldon Hout
Dept. of Land Conservation & Dev.
800 N.E. Oregon Street, #18
Portland, OR 97232-2105

Commissioner Ellie Dumbi
Lane County
125 E. 8th Avenue
Eugene, OR 97401

Coast Range Association
ATTN: Lisa A. Brown
254 S.W. Madison Avenue
Corvallis, OR 97339-2189

Dean Runyan
815 S.W. Second, #620
Portland, OR 97204

Ron Wyden
U.S. Congress
500 N.E. Multnomah, Suite 50
Portland, OR 97232

Anne Squire
160 State Capitol
Salem, OR 97310-0370

Brenda Brecke, Oregon Senator
P.O. Box 1499
Bandon, OR 97411

Sunset Beach State Park
13030 Cape Arago Highway
Coos Bay, OR 97420

John Butler
1160 N. 10th Street
Coos Bay, OR 97420

Loretta Cole
1211 Cameron Road
Coos Bay, OR 97420

Bay Area Chamber of Commerce
P.O. Box 210
Coos Bay, OR 97420

Confederated Tribes of Coos, Lower
Umpqua & Siuslaw
455 S. Fourth
Coos Bay, OR 97420

Dolores Chamberlin
10367 Cape Arago Highway
Coos Bay, OR 97420

Claudia Davis
10632 Lighthouse Way
Coos Bay, OR 97420

George Drozdowicz
Captain John's Motel
Charleston, OR 97420

Jan Hodder
3571 Fossil Point Lane
Coos Bay, OR 97420

Sidney E. Harris
Charleston Sanitary District
P.O. Box 2255
Charleston, OR 97420

Robert Donoveil
P.O. Box 984
Coos Bay, OR 97420

Larry Campbell
Oregon House of Representatives
2435 Wilson Drive
Eugene, OR 97405

Coos Bay - North Bend Water Board
P.O. Box 539
Coos Bay, OR 97420

Reese Bender
Oregon Department of Fish & Wildlife
1235 S. 11th
Coos Bay, OR 97420

Anne Collins
245 S. Schoneman
Coos Bay, OR 97420

A.W. Donnelly
5139 Crown Point Road
Coos Bay, OR 97420

James Fereday
1017 Elm Avenue
Coos Bay, OR 97420

Mr. & Mrs. Hornstuen
10335 Cape Arago Highway
Coos Bay, OR 97420

Jim Crooker
Charleston Sanitary District
4570 Eel
Charleston, OR 97420

Robert F. Downer
Federal Intermediate Credit
P.O. Box 27
Coos Bay, OR 97420

Bob Corthell
15577 Highway 101 S.
Brookings, OR 97415

Charleston Merchants Associatio
Charleston, OR 97420

D.E. & K.J. Borneman
P.O. Box 81
Coos Bay, OR 97420

Craig Cornu
6867 Oxford Way
Coos Bay, OR 97420

Nathan Douthit
663 S. 11th Street
Coos Bay, OR 97420

Mike Graybill
S. Slough National Est. Research F
P.O. Box 5417
Charleston, OR 97420

Philip J. Keizer
2300 N. 14th
Coos Bay, OR 97420

Peter DeFazio
215 S. Second Street, No. 212
Coos Bay, OR 97420

Ben Fawver
793 Johnson Avenue
Coos Bay, OR 97420

Marty Giles
Wavecrest Communications
1021 S. Fifth Street
Coos Bay, OR 97420

Michael Hosie
1103 N. Ninth Street
Coos Bay, OR 97420

Clark Lovell
850 Stock Slough Road
Coos Bay, OR 97420

S.E. Norris
Charleston Sanitary District
7210 Laurel Lane
Coos Bay, OR 97420

Irene Quick
P.O. Box 152
Coos Bay, OR 97420

Mitzi Loftus
3177 Cape Arago Highway
Coos Bay, OR 97420

Nicholas Nevarra
10565 Cape Arago Highway
Coos Bay, OR 97420

Ivan R. Puz
10425 Cape Arago Highway
Coos Bay, OR 97420

Crystal Shoji
Bay Area Chamber of Commerce
P.O. Box 210
Coos Bay, OR 97420

Duke Groff
Charleston Rural Fire Department
1800 Cape Arago Highway
Coos Bay, OR 97420

Andy Latomme
Oregon State Parks Department
365 N. Fourth Street, #A
Coos Bay, OR 97420

George McClellan
10340 Cape Arago Highway
Coos Bay, OR 97420

Patricia J. O'Reilly
10642 Lighthouse Way
Coos Bay, OR 97420

Dr. Steven S. Rumrill
S. Slough National Est. Research Res.
P.O. Box 5417
Charleston, OR 97420

Morres F. Madsen
P.O. Box 1379
Coos Bay, OR 97420

Jay O'Leary
2155 N. 11th Street
Coos Bay, OR 97420

Allan Rumbaugh
International Port of Coos Bay
P.O. Box 1215
Coos Bay, OR 97420

Tricia Shreck
House of Myrtlewood
P.O. Box 457
Coos Bay, OR 97420

Charles Holbert
Weyerhauser
1302 California
Coos Bay, OR 97420

John Littlefield
P.O. Box 1154
Coos Bay, OR 97420

Janet S. Nelson
415 S. Sixth Street
Coos Bay, OR 97420

T.C. Pennock
10530 Cape Arago Highway
Coos Bay, OR 97420

Dixie Sheldon
1125 Ingersoll
Coos Bay, OR 97420

Jay G. Miller
Western Bank
285 S. Fourth Street
Coos Bay, OR 97420

Sharon Parrish
P.O. Box 1435
Coos Bay, OR 97420

J.R. Rush
5439 Seven Devils Road
Charleston, OR 97420

Dr. & Mrs. Paul Starkey
10784 Lighthouse Way
Coos Bay, OR 97420

George Taylor
10390 Cape Arago Highway
Coos Bay, OR 97420

Jim Thornton
9140 Cape Arago Highway
Coos Bay, OR 97420

Floyd Vandervelden
Native Plant Society
1156 N. Ninth
Coos Bay, OR 97420

Dick Wheeler
4643 Bastendorff Beach Road
Coos Bay, OR 97420

Lyle Wright
10355 Cape Arago Highway
Coos Bay, OR 97420

Coos County Commissioners
Coos County Courthouse
ATTN: Bev Owens
Coquille, OR 97423

Coos County Planning Department
County Courthouse Annex
ATTN: County Planner
Coquille, OR 97423

Oregon Coast Magazine
P.O. Box 18000
Florence, OR 97439

Cape Arago Audubon Society
P.O. Box 381
North Bend, OR 97459

Scott Starkey
HC 52, Box 404
Coos Bay, OR 97420

Fred Taylor
10390 Cape Arago Highway
Coos Bay, OR 97420

Lois Tendell
543 S. Fourth Street
Coos Bay, OR 97420

John Toman
Oregon Department of Fish & Wildlife
P.O. Box 5430
Charleston, OR 97420

Larry Watson
235 Anderson
Coos Bay, OR 97420

Stuart Woods
P.O. Box 577
Coos Bay, OR 97420

B. Mosieur
P.O. Box 1221
Coos Bay, OR 97420-0317

Gary Combs
Coos County Parks Department
Coos County Courthouse
Coquille, OR 97423

Bob Manseth
Indian Forest
P.O. Box 9
Florence, OR 97439

Friends of Shore Acres
3111 Fir Street
North Bend, OR 97459

Coos County Historical Society
Simpson Park
North Bend, OR 97459

Frank Babcock
4027 Willanch Way
North Bend, OR 97459

Dave Bridgham
3111 Fir Street
North Bend, OR 97459

Jack Goll
1637 Meade
North Bend, OR 97459

Don Ivy
3060 Oak Street
North Bend, OR 97459

Ann Koppy
Coos County Hist. Society Museum
1220 Sherman Avenue
North Bend, OR 97459

Dr. Ray Nolan
Cape Arago Audubon Society
1890 Waite
North Bend, OR 97459

Sarah Sheldon
U.S. Bureau of Land Managemen
1300 Airport Lane
North Bend, OR 97459

A.W. Sweet
1381 Bayview
North Bend, OR 97459

Dennis Bosso and Tim Quinton
U.S. Coast Guard
2000 Connecticut Avenue
North Bend, OR 97459

Wallace Johnson
Oregon Shores Cons. Coalition
217 Hillcrest Drive
North Bend, OR 97459

Dixie Shelton
1220 Sherman
North Bend, OR 97459

Kelli Watson
City of North Bend
P.O. Box 5
North Bend, OR 97459-0014

J.E. Vorbach
U.S. Coast Guard
915 Second Avenue
Seattle, WA 98174-1067

Hugh Wade
P.O. Box 4607
Medford, OR 97501

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Library
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Denver, CO 80025-0047

Tom Westfall
4771 E. Bay Drive
North Bend, OR 97459

Ted Ellingsen
2485 Liberty
North Bend, OR 97459

Don McMichael
703 Mallard Lane
North Bend, OR 97459

Forrest Taylor
2580 Everett
North Bend, OR 97459

Oregon Dunes NRA
855 Highway 101
Reedsport, OR 97467

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Spokane, WA 99202

Stan Norman
U.S. Coast Guard
915 Second Avenue
Seattle, WA 98174-1067

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Depository Receiving Section
Jackson Alley Room A-150
Washington, DC 20401

USDI-BLM
ATTN: Cliff McClelland
P.O. Box 2965
Portland, OR 97208

Troy Anderson
Coquille Indian Tribe
3201 Tremont
North Bend, OR 97459

Kathy Grossman
1220 Sherman
North Bend, OR 97459

Art Schuldt
2175 Everett
North Bend, OR 97459

Jim C. Allen
City of North Bend
P.O. Box B
North Bend, OR 97459-0014

U.S.E.P.A., Region 10
ATTN: Env. Program Coordinator
1200 6th Avenue, Mail Stop WD-126A
Seattle, WA 98101

Sharon Bazor
Kalmiopsis Audubon Society
P.O. Box 1265
Port Orford, OR 97465

Joseph Miller
390 Pine Cliff Drive
Naches, WA 98937

USDI
Natural Resources Library
18th and C Streets, NW
Washington, DC 20204

Section 9.0

List of Preparers

9.0 LIST OF PREPARERS

Bureau of Land Management
Coos Bay District

Daryl Albiston - BLM Project Manager
Steve Morris - BLM Assistant Project Manager
Timothy Votow - Hazardous Materials Specialist

Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians

Howard Kubli - Tribal Administrator
Gregory Norton - Confederated Tribes Project Manager
Don Whereat - Cultural Resources Advisor

SRI/SHAPIRO, Inc.

Personnel	EIS Responsibility	Qualifications
Joseph Maser	EIS Project Manager	Ph.D., Biology 18 years of experience project management
Steven Daggett	Water Resources, Soils	M.S., Biology 2 years of experience water quality studies
Fred Small	Botany, Wetlands	B.S., Biology 4 years of experience botanical surveys wetland delineations
Bruce Hollen	Wildlife	B.S., Biology 4 years of experience wildlife surveys habitat evaluation
Cindy Hahn	Visual Resources	M.U.P., Urban Planning 11 years of experience EIS planning evaluations visual resource assessment
Tim Krause	Land Use, Air Quality Noise Quality	J.D., Environmental Law 13 years of experience EIS planning evaluations, air and noise studies

SRI/SHAPIRO, Inc. (continued)

Personnel	EIS Responsibility	Qualifications
Jeffrey Maag	Air and Noise Quality	B.S., Civil Engineering 3 years of experience Air and noise studies
Scott Luchessa	Aquatic Ecology	M.S., Environmental Studies 8 years of experience fisheries studies
Jennifer Switzer	Document Production	B.A., Sociology 2 years experience
Leslie Anderson	Cartography	B.S., Geography 8 years of cartography experience
John Andrilla	Editor	B.A., English 7 years of editing experience

Heritage Research Associates, Inc.

Rick Minor	Cultural Resources	Ph.D., Anthropology 20 years of experience Archaeological investigations
Ruth Greenspan	Archaeologist/Faunal Analysis	Ph.D., Anthropology 16 years of experience Archaeological investigations

Squier Associates

David King	Geology/Soils Utilities	B.S., Geology 16 years of experience Geologic, soil investigations
Gary Peterson	Geology	B.S., Geology 16 years of experience Geologic investigations

Dean Runyan Associates

Personnel	EIS Responsibility	Qualifications
Dean Runyan	Economics/Recreation	Ph.D., Urban and Regional Planning 22 years of experience Planning/economic analysis, travel, tourism analysis

SMH Architecture, PC

Personnel	EIS Responsibility	Qualifications
David Slusarenko	Conceptual Design	M.A., Architecture 28 years of experience Master planning, design of educational/recreational facilities
Corey Cliffe	Conceptual Design	M.A., Architecture 4 years of experience Conceptual design of facilities

Kittelson & Associates, Inc.

Personnel	EIS Responsibility	Qualifications
Peter Haliburton	Traffic Analysis	M.Sc.Eng., Transportation Engineering 16 years of experience Traffic engineering, traffic modeling

Stephen Dow Beckham

Personnel	EIS Responsibility	Qualifications
Stephen Dow Beckham	Historical Investigations	Ph.D., History/ Anthropology 26 years of experience Historical investigations, college teaching

Section 10.0

References

10.0 REFERENCES

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Hoffine, Ron. May 1995. Coos Bay. North Bend Water Board. Personal communication, with D. King, Squier Associates.

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Appendix

Oregon Department of Environmental Quality Recommended Best Management Practices for Storm Water Discharges

STATE OF OREGON
DEPARTMENT OF ENVIRONMENTAL QUALITY

Recommended Best Management Practices for Storm Water Discharges

Guidance for Eliminating or Reducing Pollutants in Storm Water Discharges Associated With Industrial Activity

August 1993
Document No. IW\WC11\WC11727.5

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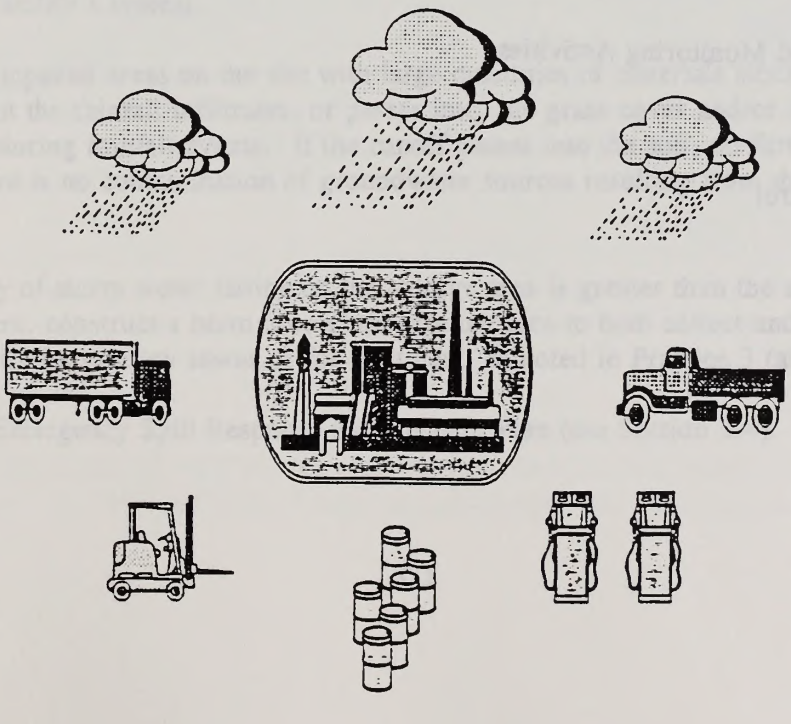
RECOMMENDED BEST MANAGEMENT PRACTICES FOR STORM WATER DISCHARGES

1.0 INTRODUCTION

Best Management Practices (BMPs) are instrumental in developing the management portion of the Storm Water Pollution Control Plan (SWPCP) required by the National Pollutant Discharge Elimination System (NPDES) General Storm Water Discharge Permits.

BMPs are measures or controls that reduce pollutants at the source to prevent the pollution of storm water runoff discharged from the site. These practices can also be used to divert runoff away from areas of exposure to pollutants, such as raw materials, intermediate products, or finished products. Further, BMPs can be used to direct polluted runoff to natural or other types of treatment. The storm water discharge permits do not require specific BMPs because the practices should be selected on a case-by-case basis depending on the particular activities ongoing at the industrial facility and other factors. These factors might include the quantity of rainfall reaching the site, the area of land available for constructing management practices, costs in implementing the practices, etc.

In selecting a BMP for the facility's storm water program, the permittee should choose "source reduction" practices as much as practicable. These are practices that reduce the amount of pollution that is generated at the site and prevent contaminants from being exposed to storm water in the first place. If this is not possible, practices that recycle or reuse the runoff on the site should be considered. Treating contaminated storm water to remove pollutants before the runoff leaves the site is the next option, although this may transfer the pollution problem from one place or medium to another since treatment will not be completely effective. Source reduction methods are the most desirable BMPs because they keep storm water away from pollutants and are frequently less costly than treatment alternatives.



2.0 STORM WATER BEST MANAGEMENT PRACTICES BY ACTIVITY

The BMPs included in this guidance document are related to source reduction and treatment methods for specific processes and activities ongoing at the industrial site. The permittee should consider the recommended practices in developing and/or revising their Storm Water Pollution Control Plan if these activities are ongoing at the facility. Further, the preventive measures mentioned may assist the facility in achieving compliance with the permit discharge limitations through pollution prevention.

All of the BMPs recommended in this guidance are intended to complement, not conflict with, existing State and Federal regulations regarding the handling, containment, or treatment of any material or waste.

The following BMPs relate to specific activities that are common for industrial facilities:

- Outside Storage of Raw Materials, Intermediate Products, By-Products or Finished Products
- Outside Container Storage and Waste Disposal
- Loading and Unloading Liquid Materials
- Emergency Spill Response and Cleanup Plan
- Above-Ground Tank Storage
- Outside Manufacturing Activity
- Fueling Stations
- Vehicle and Equipment Washing
- Vehicle and Equipment Maintenance
- Sandblasting and Painting Operations
- Inspection and Monitoring Activities
- Dust Control
- Erosion Control

2.1 OUTSIDE STORAGE OF RAW MATERIALS, INTERMEDIATE PRODUCTS, BY-PRODUCTS, OR FINISHED PRODUCTS

This BMP applies to facilities that store or stockpile raw or finished materials or products used in manufacturing or processing on their site. Materials frequently stockpiled may include sand, gravel, topsoil, wood chips, sawdust, compost, lumber and building products, or metal products.

The permittee should select from among the following practices that would be appropriate for the type of material stored outdoors and exposed to storm water runoff:

1. Build a covered area with a paved floor for storing materials to prevent contact with storm water runoff. This practice could be used for significant materials that may seriously contaminate storm water runoff (and ultimately surface water bodies) should contact occur. While this practice may prove expensive, the permittee could weigh the costs of constructing the storage area versus treating the contaminated runoff, or consider the other practices. *See Figure 2-1A.*

2. Place a temporary plastic film or sheeting over the material. If small quantities of materials are stored outdoors, it may be economical to cover them in this manner. *See Figure 2-1A.*

3. For new storage areas on the site containing significant materials, pave the area where the material will be stored and install a drainage system to collect the storm water runoff.

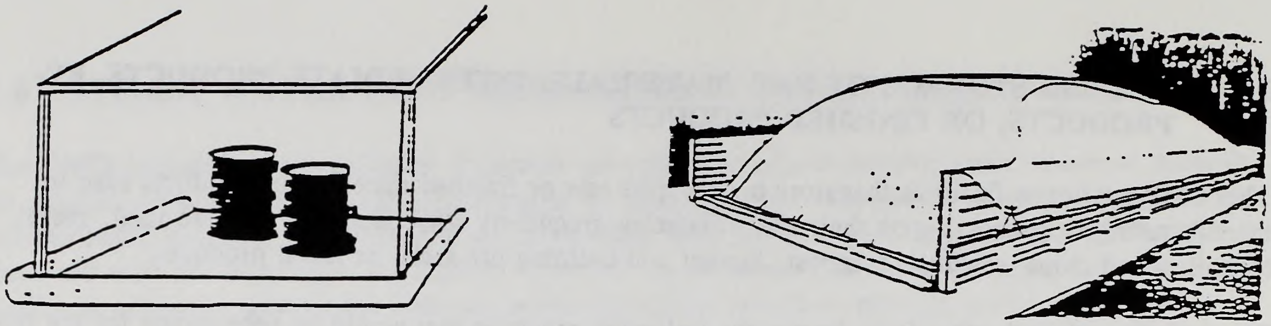
   The paved area should be sloped to minimize the pooling of water on the site, particularly with materials that could leach pollutants into the storm water. Curbing should be placed along the perimeter of the area to prevent contaminated runoff from leaving the site. The drainage system should minimize the use of catch basins in the interior of the paved area since the catch basins could fill with the stored material and clog.

   The drain from the paved area can be connected to the sanitary sewer if allowed by the local public works department. If this is not possible, then the runoff may need treatment to remove pollutants using a process appropriate for the nature of the contaminants. If a wastewater treatment system is located on the site, this system may be capable of treating the contaminated runoff. The Department's approval would be required for connection of contaminated storm water to the facility's system.

4. For existing unpaved areas on the site with large quantities of materials stockpiled, determine whether or not the rainfall infiltrates, or passes into, the grass cover and/or soil through visual observations during rainfall events. If the runoff passes into the soil, no further work is needed **provided** there is no contamination of groundwater sources resulting from the infiltration of the runoff.

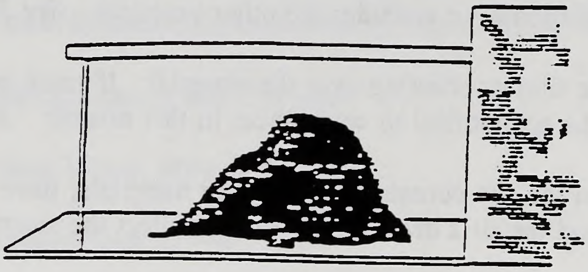
   If the quantity of storm water falling on the storage area is greater than the soil can absorb during the storm event, construct a berm around the storage area to both collect and divert the excess runoff either to the sanitary sewer or for treatment, as noted in Practice 3 (above).

5. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

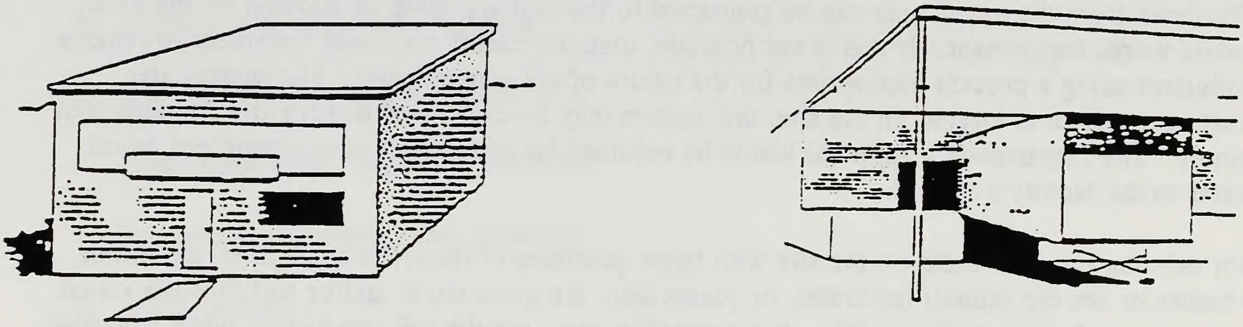


Small Chemical Storage Area with Curbing and Cover

Raw Material Storage Covered with Tarpaulin



Covered Area for Raw Materials



Enclosed Area for Storage of Raw Material or Chemicals

Covered Area for Loading and Unloading

Figure 2-1A. Outside Storage Details
(Modified from U.S. Environmental Protection Agency, Storm Water Management for Industrial Activities, September 1992)

2.2 OUTSIDE CONTAINER STORAGE & WASTE DISPOSAL

This BMP refers to containers located outdoors and used to temporarily store materials, such as accumulated food wastes, paints, oils, vegetable or animal grease, solvents, and waste materials (e.g., used batteries.)

If the industrial facility has container storage of materials in an outdoor location, the following practices are recommended to prevent contact between the container and storm water runoff:

1. Designate the location of the container area on the site and install a paved floor with bermed or curbed sides within this area to contain and keep spills of materials and contaminated storm water runoff from leaving the bermed area.

   The berm or curb should be of adequate height to contain an amount equal to the volume of the largest single storage tank, plus additional volume to account for potential rainfall accumulation. A good approximation of the needed volume would be 110% of the largest storage tank, but additional volume may be needed depending on the quantity of rainfall reaching the site. Slope the paving on the floor of the designated area to a lined sump that will prevent the transfer of spilled liquids and/or contaminated runoff to surface water or groundwater.

2. If at all possible, cover the designated area for container storage or bring the containers indoors to prevent contact with rainfall.

   If the entire area cannot be covered, it is important to cover containment bins, tanks, or hoppers to prevent rainfall from entering the container and percolating through the stored materials. Waste liquids should be covered with tarpaulins or roofed structures. The covers should be large enough to keep rainfall out of the containment berm surrounding the stored liquids.

3. Segregate and securely store incompatible or reactive materials in separate containment areas in order to prevent the mixing of chemicals should spills occur.

4. For containers that are mounted for direct removal of a liquid chemical by employees, install a paved, bermed, and covered area as described in Practices 1 and 2. Allow 110% of the container size, or some higher approximation, for the containment volume. A drip pan should be placed under the mounted container for use during transfers of the liquid. *See Figure 2-2A*

5. Install overfill protection on storage tanks and drums to minimize the risk of spilling liquids during transfer and loading. Install guards around tanks and piping to prevent damage from forklifts or vehicles.

6. Secure the designated storage area to prevent unauthorized persons from accessing storage containers and causing spills. Examples of such measures include using a locked storage building to house the containers, or using a locking system for drum lids. Also provide warning signs, such as: AUTHORIZED PERSONNEL ONLY, DANGER - HAZARDOUS MATERIALS, FLAMMABLE MATERIALS, TOXIC MATERIALS, etc.

7. Inspect all containers on a monthly basis for deterioration to make sure leakage of the substance is not occurring. This is crucial to prevent contamination of storm water runoff that will come in

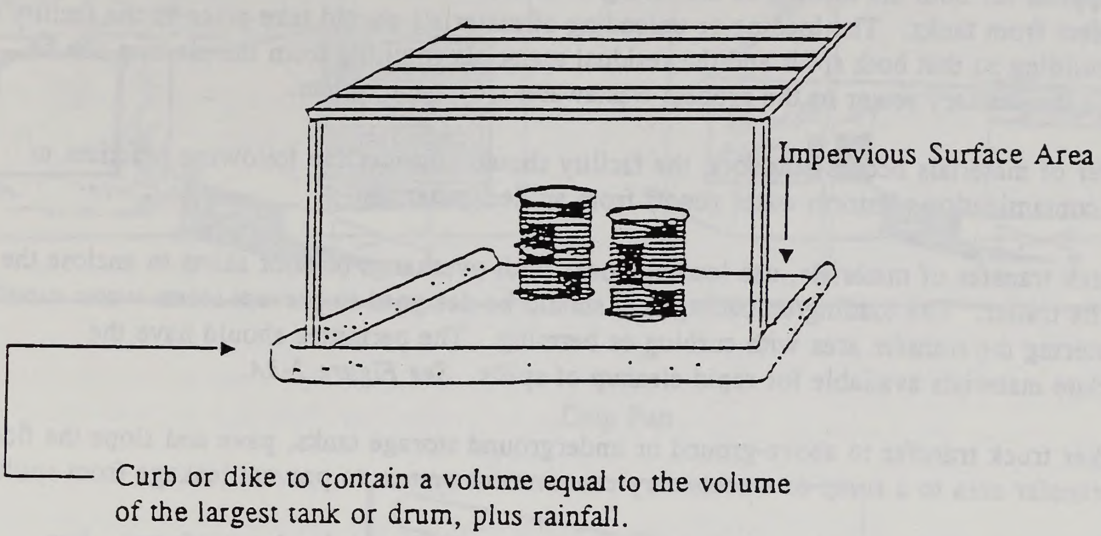
contact with containers that are not covered. Further, inspect the lids of drums or containers to ensure that they are in place and properly secured. A drum that contains materials with a specific gravity less than water may fill with rainfall from the bottom of the drum and allow the stored material to leak or spill out the top.

It may also be helpful to obtain a storm sewer map from the local public works department to identify potential surface water discharge points on and around the site and their location in relation to containers or the storage area if spills should occur.

8. If the material stored is a hazardous waste, the permittee shall comply with any additional DEQ or Federal regulations and requirements not mentioned in this guidance.

9. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

Covered Storage Area With Berm


Impervious Surface Area
Curb or dike to contain a volume equal to the volume of the largest tank or drum, plus rainfall.

Mounted Container with Drip Pan

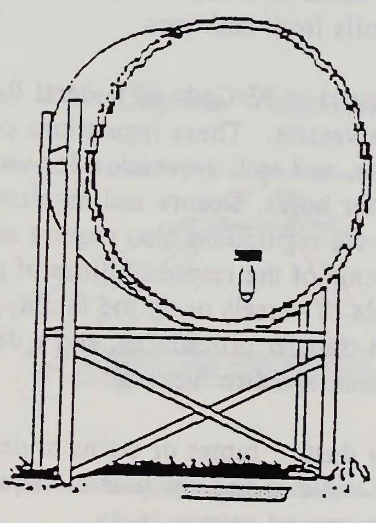


Figure 2-2A. Container Storage
(Modified from Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February, 1992 .)

2.3 LOADING AND UNLOADING MATERIALS

This BMP applies for both the loading or unloading of materials stored in containers and direct liquid or gas transfers from tanks. The loading or unloading of materials should take place in the facility's operations building so that both spills and the residual materials resulting from the cleanup can be discharged to the sanitary sewer or the process wastewater treatment system.

If the transfer of materials occurs outdoors, the facility should consider the following practices to prevent the contamination of storm water runoff from spilled materials:

1. With truck transfer of materials, use loading docks with overhangs or door skirts to enclose the end of the trailer. The loading/unloading area should be designed to prevent storm water runoff from entering the transfer area with curbing or berming. The permittee should have the appropriate materials available for rapid cleanup of spills. *See Figure 2-3A.*

2. For tanker truck transfer to above-ground or underground storage tanks, pave and slope the floor of the transfer area to a sump or a secondary containment system to prevent leakage from spills.

   The paving material used needs to be suitable for the type of liquid that is transferred. For example, gasoline should not be transferred over an asphalt surface because gas will react with and slowly dissolve the asphalt. In this case, a Portland cement concrete surface should be used.

   Place drip pans as needed when making and breaking connections for the transfer, and under hose connections, hose reels, and filler nozzles. *See Figure 2-3A.*

3. With the rail transfer of materials to above-ground or underground storage tanks, use drip pans at locations where spills may occur, as noted in Practice 2. Further, a drip pan system should be installed within the rails to collect spills from tank cars.

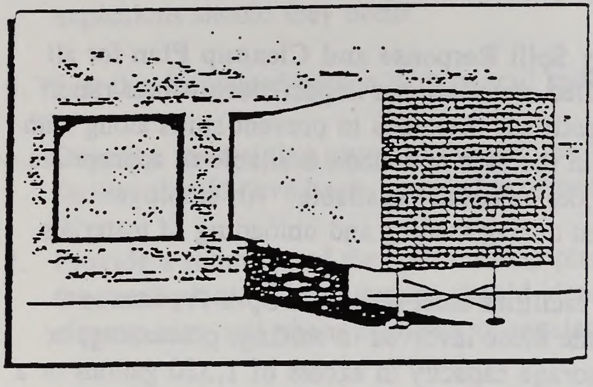
4. Follow Coast Guard Requirements found in 33 Code of Federal Rules (CFR) Titles 153, 154, and 155 for transfers to and from marine vessels. These regulations cover spill response, spill prevention at marine transfer facilities, and spill prevention for vessels. Technical requirements are specified for loading arms, transfer hoses, closure and monitoring devices, and small discharge containment. In addition, the regulations also require an operations plan and specify its general contents as follows: description of the responsibilities of personnel, nature of the facility, hours of operation, sizes and numbers of vessels using the facility, nature of the cargo, procedures if spills occur, petroleum transfer procedures, and a description and location of equipment for monitoring, containment, and fire fighting.

5. Examine loading/unloading areas for dust or fumes or stains to determine if materials are being lost during these operations. Check vehicles and equipment frequently for leaks and repair them promptly. Clean up any leaks to the ground appropriately.

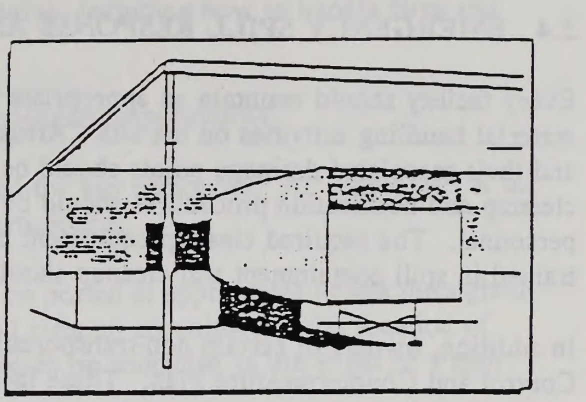
   It may also be helpful to obtain a storm sewer map from the local public works department to identify potential surface water discharge points on and around the site and their location in relation to containers or the storage area if spills should occur.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

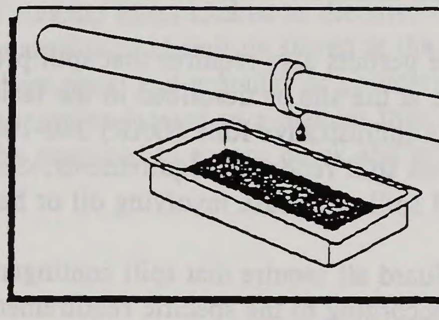
Dock with Door Skirt



Dock with overhang



Drip Pan



Drip Pan Within Rails

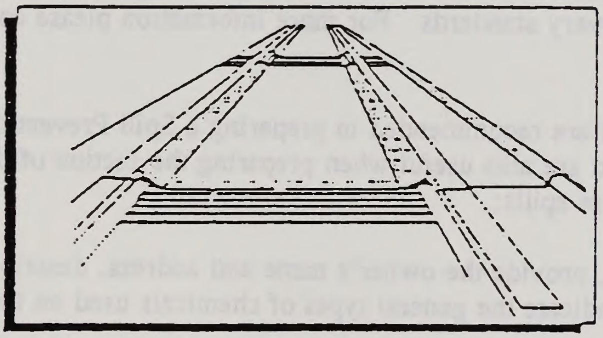


Figure 2-3A: Loading and Unloading Liquid Materials
(From City of Seattle, WA, Water Quality Best Management Practices
Manual for Commercial and Industrial Businesses, June 30, 1989.)

2.4 EMERGENCY SPILL RESPONSE AND CLEANUP PLANS

Every facility should maintain an appropriate **Emergency Spill Response and Cleanup Plan** for all material handling activities on the site. Areas where spilled materials can impact storm water runoff and their associated drainage points should be clearly identified. Methods to prevent spills along with cleanup and notification procedures should be identified in the plan and made available to appropriate personnel. The required cleanup equipment must be on site or readily available. An employee trained in spill containment and cleanup should be present during loading and unloading of materials.

In addition, owners of certain non-transportation related facilities must prepare a Spill Prevention Control and Countermeasure Plan. These facilities include those involved in storing, processing, or refining oil and oil products which have above-ground storage capacity in excess of 1,320 gallons or a single container in excess of 660 gallons, or have underground storage capacity in excess of 42,000 gallons, or due to location could reasonably expect spilled oil to reach waters of the United States or adjoining shorelines Please see 40 Code of Federal Regulations (CFR) Part 112 or call EPA at 1-800-424-4EPA for more information about this requirement.

The NPDES storm water discharge permits also requires that spill prevention and response procedures for any significant material present at the site be described in the facility's storm water pollution control plan. In addition Oregon Administrative Rule (OAR) 340-108, *Oil and Hazardous Material Spills and Releases*, further specifies spill reporting requirements, cleanup standards and liability that attaches to an actual or threatened spill or release involving oil or hazardous material.

The DEQ, EPA and U.S. Coast Guard all require that spill contingency plans be prepare for oil transferring and storage facilities according to the specific requirements set forth in their rules. DEQ rules may be found in OAR 340-47, *Regulations Pertaining to Oil Spills Into Public Waters*. The EPA requirements may be found in 40 CFR Part 112. In response to the Oil Pollution Act of 1990, EPA recently proposed amendments to 40 CFR Part 112 which may be found in Federal Register Volume 58, No. 30, February 17, 1993. The U.S. Coast Guard's interim rules may be found in Federal Register Volume 58, No. 23, February 5, 1993. Although the requirements from each agency are somewhat similar there are differences in planning volumes for worst case spills, initial response times, and recovery standards. For more information please contact the Department of Environmental Quality.

The following guidelines are recommended in preparing a Spill Prevention Control and Countermeasure Plan and are also useful when preparing the section of the storm water pollution control plan that addresses spills:

1. Describe the facility, provide the owner's name and address, describe the nature of the activities at the facility, and indicate the general types of chemicals used on the site.

2. Provide a site plan showing the location of chemical storage areas, the location of storm drains, the direction of the slope of the site toward the drains, and the location and description of any structures or devices on the site, such as control valves or lined sumps, to prevent spills from leaving the site.

3. Provide notification procedures that will be used in the event of a spill for contacting key personnel and local and state government agencies.

4. Provide detailed instructions regarding cleanup procedures, including how to handle fires and explosions should they occur.

5. List the designated person with overall spill response cleanup responsibility.

6. Describe the training program that will be implemented for key personnel. All employees at the facility should have basic knowledge of spill control procedures.

7. Provide a summary of the spill cleanup plan that will be posted at appropriate points throughout the work place. The summary should identify the spill cleanup coordinators, the location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill.

8. If a spill occurs, cleanup should begin **immediately**. No emulsifier or dispersant shall be used. If the spill could reach sanitary or storm sewers or surface waters, local and state government officials should be notified **immediately**.

9. Provide information about the cleanup kit(s) located at the site. The contents of the kit should be appropriate for the type and quantities of chemicals stored at the facility. The kit may contain the following: lined drums, absorbent pads, and granular or powdered materials for neutralizing acids or alkaline liquids. The kits should be located in a manner that allows easy access and use by employees, and drills should be practiced to ensure quick and effective response.

2.5 ABOVE-GROUND TANK STORAGE

These best management practices are recommended for tank storage systems that many facilities maintain on their sites. The following practices should complement any special requirements for these systems, such as any additional restrictions imposed by the Fire Marshall's Office.

1. Install an overfill protection on the storage tank to minimize the risk of spilling liquids during transfer and loading. Install guards around the tanks and piping to prevent damage from forklifts or vehicles.

2. For permanently installed tank storage systems, use curbing or diking to contain spills and leaks. The curbing should be of adequate height to contain a volume equal to the volume of the largest single storage tank plus rainfall, if the storage area is uncovered. A good approximation of the needed volume would be 110% of the largest storage tank, but additional volume may be needed depending on the quantity of rainfall reaching the site.

   The floor area enclosed by the curbing needs to be covered with an impervious surface and sealed to prevent spills from contaminating groundwater. Further, the paved floor should be sloped to a lined sump for collection of small spills. Weekly cleaning of the sump is needed to minimize the contamination of storm water. *See Figure 2-5A.*

3. If no contaminants are present, collect and remove or discharge accumulated rainfall from the curbed area frequently during the wet season.

4. Install and maintain an oil/water separator for treating storm water that is discharged from a petroleum tank farm for removal of contaminants.

5. Train employees in operating procedures, and label valves and piping to reduce human error.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

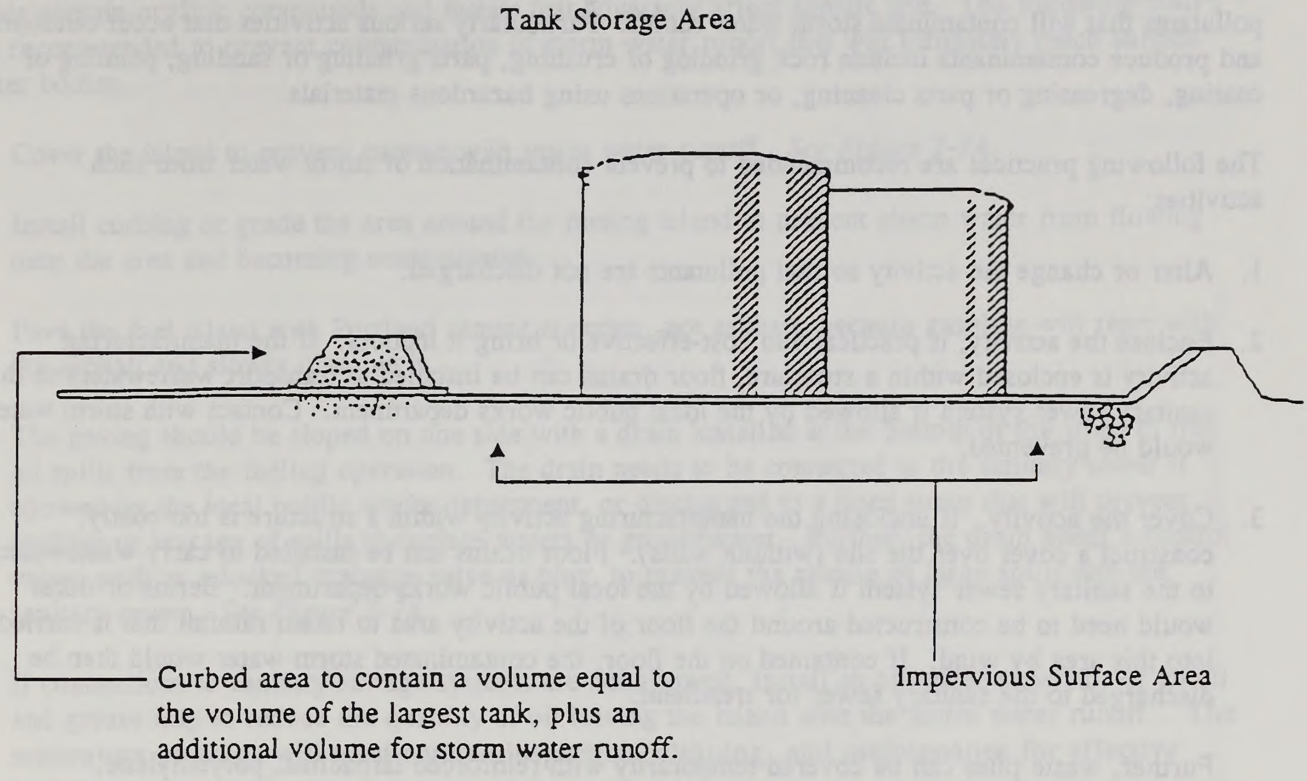

Tank Storage Area
Curbed area to contain a volume equal to the volume of the largest tank, plus an additional volume for storm water runoff.
Impervious Surface Area

Figure 2-5A: Tank Storage System
(Modified from City of Seattle, WA, Water Quality Best Management Practices for Commercial and Industrial Businesses, June 30, 1989)

2.6 OUTSIDE MANUFACTURING ACTIVITY

Some industrial facilities may carry out manufacturing activities in outdoor areas and produce pollutants that will contaminate storm water runoff. Particularly serious activities that occur outdoors and produce contaminants include rock grinding or crushing, parts grinding or sanding, painting or coating, degreasing or parts cleaning, or operations using hazardous materials.

The following practices are recommended to prevent contamination of storm water from such activities:

1. Alter or change the activity so that pollutants are not discharged.

2. Enclose the activity, if practical and cost-effective or bring it indoors. If the manufacturing activity is enclosed within a structure, floor drains can be installed to transport wastewaters to the sanitary sewer system if allowed by the local public works department. Contact with storm water would be prevented.

3. Cover the activity. If enclosing the manufacturing activity within a structure is too costly, construct a cover over the site (without walls). Floor drains can be installed to carry wastewaters to the sanitary sewer system if allowed by the local public works department. Berms or dikes would need to be constructed around the floor of the activity area to retain rainfall that is carried into this area by wind. If contained on the floor, the contaminated storm water would then be discharged to the sanitary sewer for treatment.

   Further, waste piles can be covered temporarily with reinforced tarpaulins, polyethylene, polyurethane, Hypalon or polypropylene to prevent contamination of runoff.

4. Segregate the activity. If parts of the manufacturing process are the worst source of pollutants, these parts can be covered or enclosed to prevent contact with storm water. Floor drains can be installed, if allowed by the local public works department, to transfer wastewaters to the sanitary sewer system.

5. Establish a waste reduction program at the facility to eliminate or reduce the quantity of waste generated. Consider the following in establishing such a program: production planning and sequencing, process or equipment modifications, raw material substitutions or elimination, housekeeping measures and loss prevention, waste segregation and separation, closed-loop recycling, and employee training and education in waste reduction.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.7 FUELING STATIONS

Fueling may occur at warehouses or businesses that maintain fleets of vehicles, or at port facilities. Fuels contain organic compounds and metals that adversely affect aquatic life. The following BMPs are recommended to prevent contamination of storm water runoff that will ultimately reach surface water bodies.

1. Cover the island to prevent contact with storm water runoff. *See Figure 2-7A.*

2. Install curbing or grade the area around the fueling island to prevent storm water from flowing onto the area and becoming contaminated.

3. Pave the fuel island with Portland cement concrete, not asphalt, because gasoline will react with the asphalt and slowly dissolve it.

   The paving should be sloped on one side with a drain installed at the bottom of the slope to trap all spills from the fueling operation. The drain needs to be connected to the sanitary sewer if allowed by the local public works department, or discharged to a lined sump that will prevent spillage or leakage of spills to surface waters or groundwater. Further, the drain needs a control valve, such as a locked drainage valve or plug, to prevent the release of large spills into the sanitary sewer. *See Figure 2-7A.*

   If connections to sanitary sewage systems are not allowed, install an oil/water separator or an oil and grease trap to reduce the quantity of oil leaving the island with the storm water runoff . The separators or traps will need routine inspection, cleaning, and maintenance for effective operation.

4. Do not clean the fueling island with water and detergents. Spilled fuels, oils and grease will leave the site and contaminate surface waters if this method is used. Clean the fueling island using dry methods like spot cleaning with adsorbents or mechanical sweepers. Use a damp cloth for the pumps and a damp mop on the paved area.

5. Retain suitable cleanup materials on the site for prompt cleaning of all spills. Sorbent materials like spill pads, spill booms, or kitty litter will be effective in containing certain spills. Do not wash any spill into the storm drain. Dispose of the absorbent materials appropriately.

6. Post signs to educate employees. Personnel responsible for fueling vehicles should avoid overtopping fuel tanks.

7. If the fueling facility serves very large mobile equipment, such as log loaders, construct a curb or berm around the fueling area both to collect rainfall falling on the pad and prevent the run-on of storm water from the surrounding area. Follow the procedures given in Section 2.3 for loading and unloading materials.

8. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

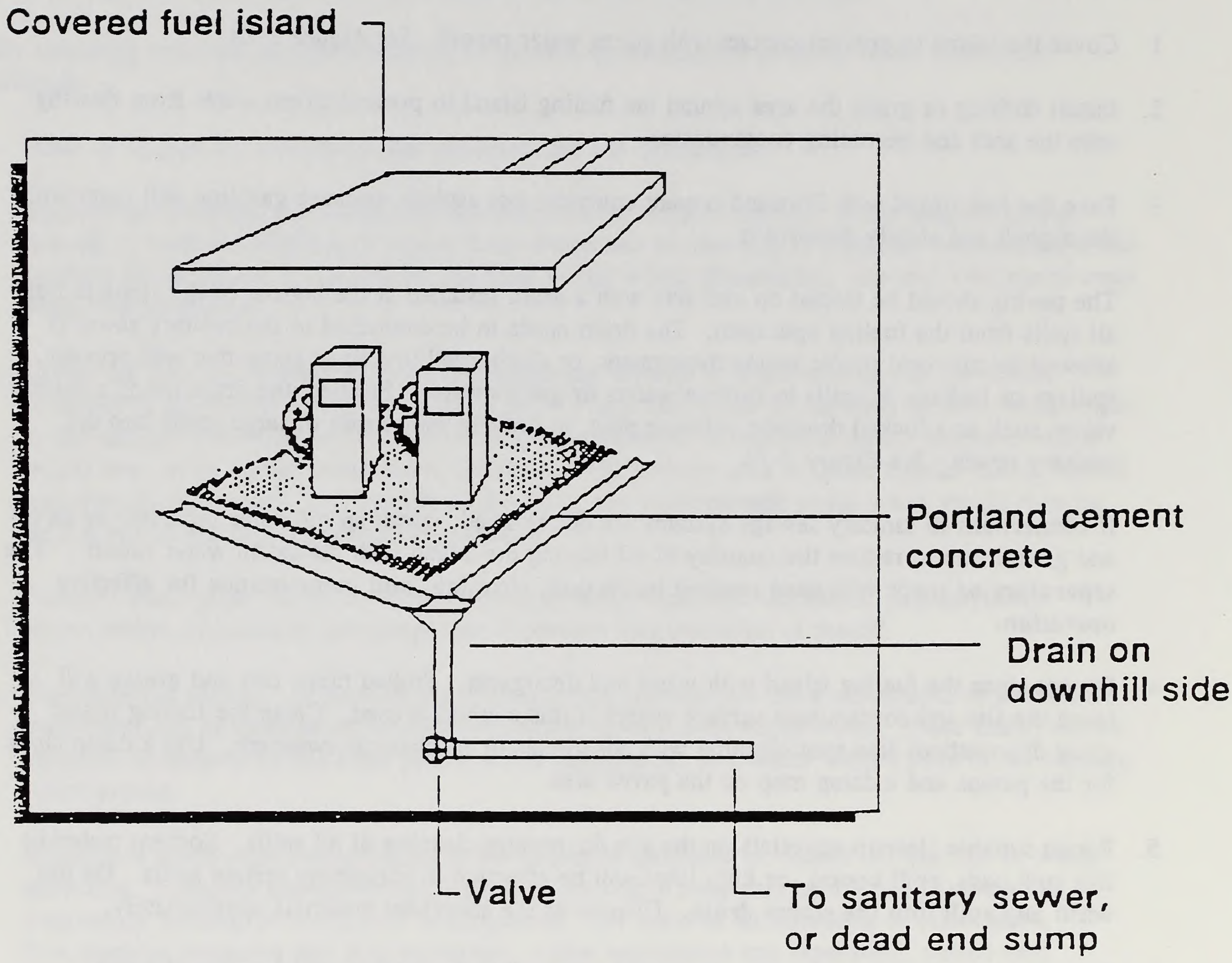


Figure 2-7A: Covered Fuel Island
(From Washington Department of Ecology, WA, Storm Water Management Manual for the Puget Sound Basin, February 1992.)

2.8 VEHICLE AND EQUIPMENT WASHING

Wash water from vehicle and equipment cleaning operations contains a variety of contaminants which can be harmful to aquatic life and the quality of surface water bodies. These contaminants include detergents, degreasing chemicals, oils, suspended solids, heavy metals, and organics that can cause serious pollution problems.

The disposal of wash waters from vehicle and equipment cleaning activities to the ground or to surface waters is prohibited by Oregon Administrative Rule 340-45-015 unless a permit is first obtained from the DEQ. This is a different permit from the storm water discharge permit.

Options for disposal of wash water include:

1) Installing a washing system that recycles all wastewater. Recycling systems remove oil and solids from the wastewater so that the water may be reused. installation may require approval or a permit from the local planning department. A full recycle system, which has no discharge, does not require a DEQ permit.

2) Discharging wastewater to sanitary sewer. This usually requires the permission of your local sanitary authority or public works department. Also, certain jurisdictions may require pre-treatment of the wastewater before discharge to sanitary sewer is allowed. You may also be able to connect to the sanitary system through existing floor drains if the drains are already connected to sanitary sewer. Discharging to a sanitary sewer does not require a DEQ permit.

3) Washing your vehicles at a commercial vehicle washing operation with an approved disposal system. Check to make sure that the facility you choose has an appropriate permit. Not all wash facilities dispose of their wastewater properly.

4) If none of the above options are feasible, you may be able to discharge to the storm drainage system or to ground, if you first obtain a permit from DEQ. The Department recently adopted General National Pollutant Discharge Elimination System (NPDES) Permit 1700-J to permit the proper disposal of wash water. There is a fee for this permit. Please contact the appropriate DEQ Regional Office for your area to obtain information about the permit (see Section 4.1 and Table 4-1A).

2.9 VEHICLE AND EQUIPMENT MAINTENANCE

Since many industrial facilities maintain vehicles and equipment, storm water can easily become contaminated with solvents, oil, grease, waste automotive fluids, acids, and caustic wastes. These substances are harmful to aquatic life, and measures should be implemented to prevent storm water contamination.

The following practices are recommended:

1. Clean vehicle and equipment parts without using solvents. This will save on disposal costs since many solvents must be disposed of as hazardous wastes. Parts can be scraped with a wire brush or placed in a bake oven for cleaning. If solvents are used, designate a centralized cleaning station to keep solvents and residues in one location. Use drip pans, drain boards, and drying racks to direct drips and spills into a fluid holding tank for reuse.

2. Use nontoxic or less toxic solvents and cleaners. Examples include using non-caustic detergents for parts cleaning and using detergent-based or water-based cleaning systems instead of organic solvent degreasers.

   Replace chlorinated organic solvents, such as 1,1,1-trichloroethane or methylene chloride, with non-chlorinated solvents such as kerosene or mineral spirits. If the list of active ingredients on the solvent container includes the term "chlor," then the solvent is chlorinated.

   Use cleaners that can be recycled if possible. The supplier of the cleaners and solvents along with trade journals for the industry can provide information regarding waste minimization for these activities.

3. Do not use running water from a hose to clean the work areas because the contaminated water could enter the storm drainage system and ultimately surface water bodies. Rags or spill pads can be used for cleaning small spills and a damp mop can be used for general cleaning. Contact the local public works department before discharging the mop water into the sanitary sewer. Sorbent materials including kitty litter, sawdust, spill pads and spill booms may be used for containing large spills. Dispose of clean up materials appropriately.

4. Place a drip pan underneath vehicles and equipment when performing maintenance such as removing parts, unscrewing filters, or unclipping hoses. Promptly transfer the used fluids to the proper waste or recycling drums. Open containers, including full drip pans, should not be left lying around on the site.

5. Do not pour used or leftover cleaning solutions, solvents, and automotive fluids into storm drain inlets or ditches, floor drains, sinks, or into the sanitary sewer due to the toxicity of the substances. Floor drains, even those under cover, are frequently connected to the storm drainage system. Floor drains which are connected to storm sewer should be plugged or, with the permission of the local sanitary authority, routed to sanitary sewer. Post signs at these potential discharge points to educate employees so that the wastes are not disposed of improperly.

   Contact the distributor of leftover materials to see if unused portions can be returned. In the future purchase only the material needed, do not stockpile. Contact the DEQ Hazardous Solid

Waste Division at (503)229-5913 for information about disposal and recycling options.

6. Place used oil filters in funnels over the waste oil recycling or disposal collection tank to drain excess oil. Crush and recycle used oil filters if possible.

7. When vehicles are driven to the site for repair, examine them for discharge of leaks. Place drip pans under the vehicles to collect fluids for recycling or proper disposal. Designate a central area on the site for draining and replacing motor oil, coolant, and other fluids. This area should be easily cleaned of spills and leaks. Further, storm water runoff from this area should not be allowed to drain into the storm drainage system, and the local public works department should be contacted prior to discharging the runoff into the sanitary sewer.

8. If damaged equipment or wrecked vehicles arrive on the site, drain and collect all engine and transmission fluids. If the equipment or vehicles were drained prior to arrival at the site, place drip pans under them immediately to contain leakage since oils and other fluids may drip for several days. Dispose or recycle all fluids appropriately.

   (Note: Air conditioning systems must be emptied by certified technicians. For more information about freon recovery regulations, please contact the EPA at 1-800-296-1996.)

9. Build a shed or roof over areas used for parking equipment or vehicles that need repair or are retained for parts supply.

10. Store all cracked batteries in a non-leaking secondary container to retain acid leaks.

11. Consider recycling used materials such as degreasers, oil or oil filters, antifreeze, cleaning solutions, automotive batteries, and hydraulic fluid. Separate wastes to reduce treatment costs and make recycling efforts easier. For example, keep chlorinated solvents separate from non-chlorinated solvents, separate hazardous and non-hazardous wastes, and do not mix used oil and solvents. Discuss waste separation techniques with the waste hauler or recycling company for the site.

12. Discuss pollution prevention measures with employees and seek their suggestions on waste reduction. Consider incentives for employees, such as a reward program, to promote pollution prevention.

13. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.10 SANDBLASTING AND PAINTING OPERATIONS

Sandblasting and painting operations use materials and produce waste, both during operations and afterwards, that are potentially harmful to both human health and the environment. Overspray of paints, blasting without adequate containment, and uncovered grit piles all contribute to what can result in serious water pollution from toxic metals and highly toxic materials from antifouling paints. This pollution can lead to irreversible and lethal effects for a broad spectrum of aquatic organisms. Dumping of paints, solvents, adhesives, oils, detergents, grit material, etc., not only damages the environment, but it is illegal and a violation of the Federal Clean Water Act and Oregon Administrative Rule. Further, if materials classified as hazardous wastes are discharged, the dumping also violates hazardous waste regulations.

Generators of grit waste are required to characterize, handle and dispose of sandblast waste according to state and federal regulations. This means that generators are responsible for determining if their waste is hazardous. The Toxicity Characteristic Leaching Procedure (TCLP) test is used to determine if wastes are hazardous. Any wastes that fail the TCLP test must be managed, stored, and disposed of as a hazardous waste. This includes making sure the waste does not enter state waters. Wastes containing antifouling ingredients must pass both the TCLP test and an aquatic toxicity test before being classified as not hazardous.

Of particular concern is paint, grit or water waste containing antifouling ingredients, such as tributyl tin (TBT) or cuprous oxide, which require special handling because of their impact to the environment. Recent studies indicate even the abrasive material, before blasting, can be harmful to marine life. The following guidelines are general recommendations for blasting and painting operations. However, specific guidelines to be followed for management of paint or grit waste, with or without antifouling ingredients, are identified in *Best Pollution Prevention Practices for Sandblasting and Painting*. For copies of this document, please contact the appropriate DEQ Regional Office. See Section 4.1 and Table 4-1A. The following are best management practices for sandblasting and painting:

1. Prevent paint chips, abrasive blast material (before blasting), and grit waste from coming in contact with storm water runoff and surface water bodies. Outdoor blasting and painting should be done in designated areas that provide adequate protection to prevent overspray and fugitive emissions to insure compliance with the state and federal air quality regulations.

2. Operate all designated sites for blasting and painting operations with containment doors and ventilation filtration equipment in good working order.

3. When operating outside permanent blasting facilities, use portable containment such as tarps, shrouds, or portable containment structures to minimize airborne fugitive emissions.

4. Give special attention to existing wind and weather conditions in order to further minimize the impact of airborne emissions. Do not operate in windy conditions.

5. Provide a thorough cleaning of spent paint, paint chips, protective coatings, grit waste, etc., to prevent the discharge of these wastes into state waters.

6. Segregate wastes whenever possible to reduce treatment, disposal, and management costs. It is

particularly important to separate nonhazardous wastes from hazardous wastes because of different regulatory requirements, and different treatment and disposal costs. Dispose of wastes appropriately.

7. Recycle solvents and any other materials where recycling opportunities exist.

8. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.11 INSPECTION AND MONITORING ACTIVITIES

Inspecting and monitoring the equipment used in industrial processes can be important in preventing problems that can lead to leaks or spills of potential contaminants for storm water runoff. These activities are also needed for proper maintenance of storm water facilities on the site. Without adequate maintenance, sediment and other debris can quickly clog storm water facilities and make them useless.

2.11.1 Maintenance Practices for Equipment and Process Areas

A. Perform frequent inspections for structural integrity of items such as piping, valves, controls, joints, welds, tanks, drums, roofs, pavement, or other sources of potential leaks and spills on the site that can contaminate runoff. These may be visual inspections or some form of nondestructive testing method, such as hydrostatic pressure or acoustic emission tests.

B. Consider the installation of monitoring systems for areas on the site where overflows, spills, and catastrophic leaks are possible. Train staff in the use of the monitoring equipment for proper operation.

C. Ensure that staff are present during material transfers both to prevent spills if possible and to clean up spills immediately. The personnel should be properly trained in spill containment methods including the use of sorbent materials, gelling agents and vacuum and pump systems.

D. Post signs and labels at areas where information is needed to prevent contaminants from being released to storm water discharges, such as material transfer, loading and unloading, or equipment areas. The names and phone numbers of both facility and regulatory staff should be posted with phone numbers for contact in case of an accidental discharge or fire.

2.11.2 Maintenance Practices for Storm Water Facilities

A. Inspect catch basins, drainage pipes, spillways, control valves and plugs, and related drainage structures at least annually to determine if maintenance is needed. It may be useful to inspect the storm sewer outfalls during a significant rainfall or snow melt event to determine how well the system is working.

B. Immediately repair any deterioration threatening the structural integrity of the facilities. Such repairs may include: replacing catch basin lids or control valves, removing rock and debris from spillways, clearing clogged pipes or drainage inlets, or removing excessive growth from drainage ditches for proper operation.

C. Sweep paved areas and remove debris as frequently as needed and, if possible, before a rainfall event to prevent clogging of drainage structures.

D. Post warning signs adjacent to all storm drain inlets to convey messages such as "Dump No Waste - Drains to Ground Water," "Streams," "Lakes," "Ocean," etc.

2.12 DUST CONTROL

Dust controls may be needed on industrial sites for various reasons, including land disturbance, demolition, and material handling areas. If effective, dust controls can prevent pollutants from contaminating storm water runoff by reducing the surface and air transport of dust caused by these activities.

2.12.1 Practices to Control Dust from Land Disturbance and Demolition Activities

A. Use temporary controls such as palliatives, or chemical soil treatments, that are applied as spray-on adhesives. Common palliatives include calcium chloride, anionic asphalt emulsion, latex emulsion, and resin-water emulsions. Since certain chemicals may be inappropriate for some soil types or application areas, the permittee should check with the local government prior to application of the chemical treatments. Vehicles should not be driven over the treated area to prevent the tracking of the chemicals to other areas on or off the site.

In addition, irrigation is a temporary measure involving a light application of water to moisten the soil surface. The correct amount of water should be applied because an excess of water can cause erosion.

B. Minimize soil exposure by temporary or permanent soil stabilization controls, such as mulching, seeding, applying topsoil, spreading coarse gravel or crushed stone, or planting trees. If existing vegetation on the site can be maintained, this will help in controlling dust.

C. Install temporary or permanent wind breaks or barriers that reduce airborne particles by slowing wind velocities and causing the particles to drop. Large trees and shrubs left in place can provide wind barriers, while temporary measures include solid board fences, tarp curtains, sediment walls, crate walls, and bales of hay.

D. In arid regions, use tillage or deep plowing of soil to provide dust control. Large clumps of soil are deposited on top of the dust particles, preventing their movement by wind or water.

E. Inspect the sites requiring dust controls frequently and reapply materials or controls as needed.

2.12.2 Practices to Control Dust from Material Handling, Process and Transfer Areas

A. Install dust collection systems, such as negative pressure systems (vacuum systems), or collector systems (bag and cyclone), or filter systems.

B. Use water spraying and collect the dust-contaminated waters for treatment.

C. Use street sweepers to collect dusts. The vacuum type are more efficient and are most effective on dry areas. Brush sweepers can also be used.

D. Train employees in the proper operation of the equipment according to the manufacturers' recommendations and inspect the equipment regularly.

2.13 EROSION AND SEDIMENT CONTROL

This section is intended for those industrial facilities which may have areas of landscaping or exposed soils that are subject to the erosive action of wind or water. It is not intended to be used as guidance for large scale construction projects.

Erosion is the process by which soil particles are loosened and displaced by the action of water or wind on the soil surface. The loosened particles are called sediment, and the deposition of this material in streams is called sedimentation. Sedimentation and turbidity associated with sediment laden flows degrade water quality. Turbidity in water interferes with photosynthesis and sediment silts in fish spawning beds and clogs the gill passages of fish.

Over time, erosion control is more effective than sediment control in preventing water quality problems. Erosion control is less subject to failure due to high flows, requires less maintenance, and is also less costly. In some cases a combination of erosion control and sediment control may be required. The following best management practices can be used for areas on industrial sites with exposed soil due to steep slopes, soil stockpiles, heavy equipment traffic, or minor construction projects. Regular inspection and prompt maintenance are critical to the success of all the practices in this section. The selection of an appropriate measure will depend on the degree of slope on the site, sensitivity of the area to the intended use, stream or wetland features in the area, and type of soil encountered.

Please note that construction activities, including clearing, grading and excavation, which disturb five (5) or more acres require NPDES general storm water permits. The five acre limit is currently being reviewed by EPA and may be lowered. Please contact the DEQ for further information. See Section 4.1 and Table 4-1A.

2.13.1 Erosion Control Practices

The following are recommended erosion control practices:

A. ***The preservation of existing vegetation on the site.*** Preserving the existing vegetation is frequently the best preventative measure for erosion. Because native or existing vegetation is already established, it is usually a better cover species than introduced species. Where possible, establish "do not disturb" zones on your site. *See Figure 2-13A.*

B. ***The implementation of vegetative and soil protection practices for soils that are already exposed.*** These practices reduce erosion potential in several ways. They shield the soil from the direct impact of rainfall or runoff, increase soil porosity and water storage capacity of the soil, reduce the energy of the runoff, and physically hold the soil in place with the root system of the vegetation. Vegetative erosion controls include:

- The establishment of ***vegetative cover***, either as a permanent cover or as a temporary measure prior to permanently stabilizing the area. Vegetative buffers or complete coverage can provide a significant reduction of erosion potential. This can be accomplished by seeding, seeding and mulching, seeding and matting, or sodding. Maintenance may be required to successfully vegetate an area. This practice is not suited for areas which carry heavy traffic.

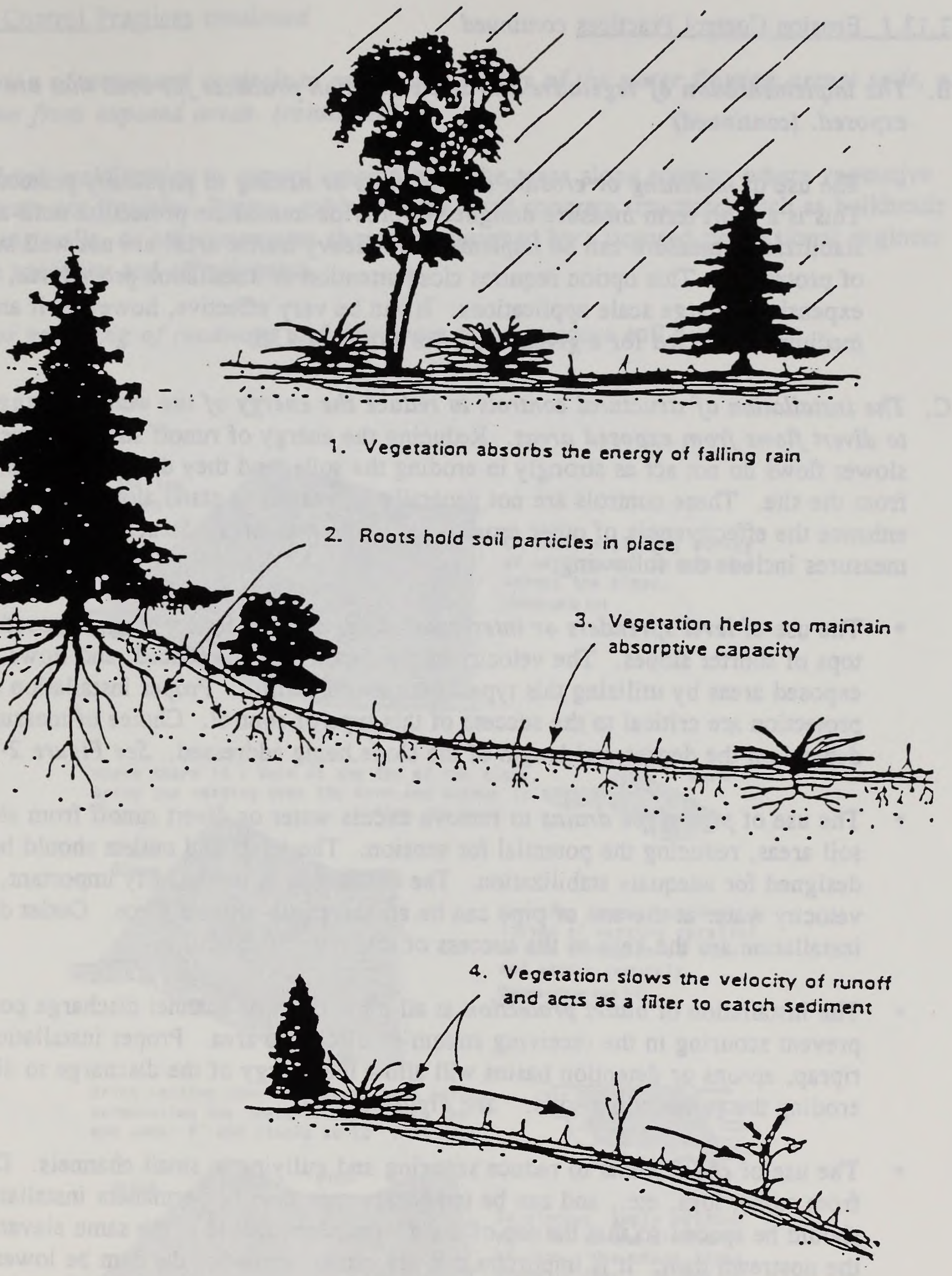

1. Vegetation absorbs the energy of falling rain
2. Roots hold soil particles in place
3. Vegetation helps to maintain absorptive capacity
4. Vegetation slows the velocity of runoff and acts as a filter to catch sediment

Figure 2-13A: Effect of Vegetation on Storm Water Runoff
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

B. ***The implementation of vegetative and soil protection practices for soils that are already exposed. (continued)***

- The use of ***mulching or erosion control mats or netting*** to physically protect exposed soils. This is a short term measure designed to provide immediate protection until a more permanent stabilization measure can be implemented. Heavy traffic areas are not well suited to this type of protection. This option requires close attention to installation procedures, and may be expensive in large scale applications. It can be very effective, however, if an appropriate medium is selected for a given site. *See Figure 2-13B.*

C. ***The installation of structural controls to reduce the energy of the water flowing across soils, or to divert flows from exposed areas.*** Reducing the energy of runoff streams is beneficial in that slower flows do not act as strongly in eroding the soils, and they do not carry as much sediment from the site. These controls are not generally successful as stand alone measures, but may enhance the effectiveness of other erosion reduction measures. Structural erosion control measures include the following:

- The use of ***level spreaders or interceptor dikes and swales*** for long, exposed slopes or at the tops of shorter slopes. The velocity of the runoff can be reduced, and flows diverted from exposed areas by utilizing this type of structural control. Proper installation and use of outlet protection are critical to the success of this type of control. Choice of measure and spacing depend on the degree and length of the slope being addressed. *See Figure 2-13C.*

- The use of ***pipe slope drains*** to remove excess water or divert runoff from slopes or saturated soil areas, reducing the potential for erosion. The inlets and outlets should be properly designed for adequate stabilization. The outlet area is particularly important, as the higher velocity water at the end of pipe can be an extremely erosive force. Outlet design and correct installation are the keys to the success of this type of control.

- The installation of ***outlet protection*** at all pipe, ditch or channel discharge points to help prevent scouring in the receiving stream or discharge area. Proper installation of stone, riprap, aprons or detention basins will allow the energy of the discharge to dissipate without eroding the surrounding soils. *See Figure 2-13D.*

- The use of ***check dams*** to reduce scouring and gullying in small channels. Dams can be built from stone, logs, etc., and can be temporary measures or permanent installations. Dams should be spaced so that the top of the downstream dam is at the same elevation as the toe of the upstream dam. It is important that the center section of the dam be lower than edges. If the edges are lower or at the same elevation as the center the chance for washouts at the ends increases dramatically.

  These structures also tend to act as sediment control structures, so it is important that they be inspected and maintained regularly to insure adequate performance. Excessive sediment build-ups must be removed in order for the dam to be most effective.

C. ***The installation of structural controls to reduce the energy of the water flowing across soils, or to divert flows from exposed areas. (continued)***

- *Stream bank stabilization* to control erosion from the areas along streams where vegetative practices are not feasible. Riprap, gabions, reinforced concrete structures such as bulkheads or retaining walls, or other measures should be designed by a licensed professional engineer to insure adequacy and effectiveness.
- *Paving or graveling of roadways and driveways* to help reduce soil disturbance.

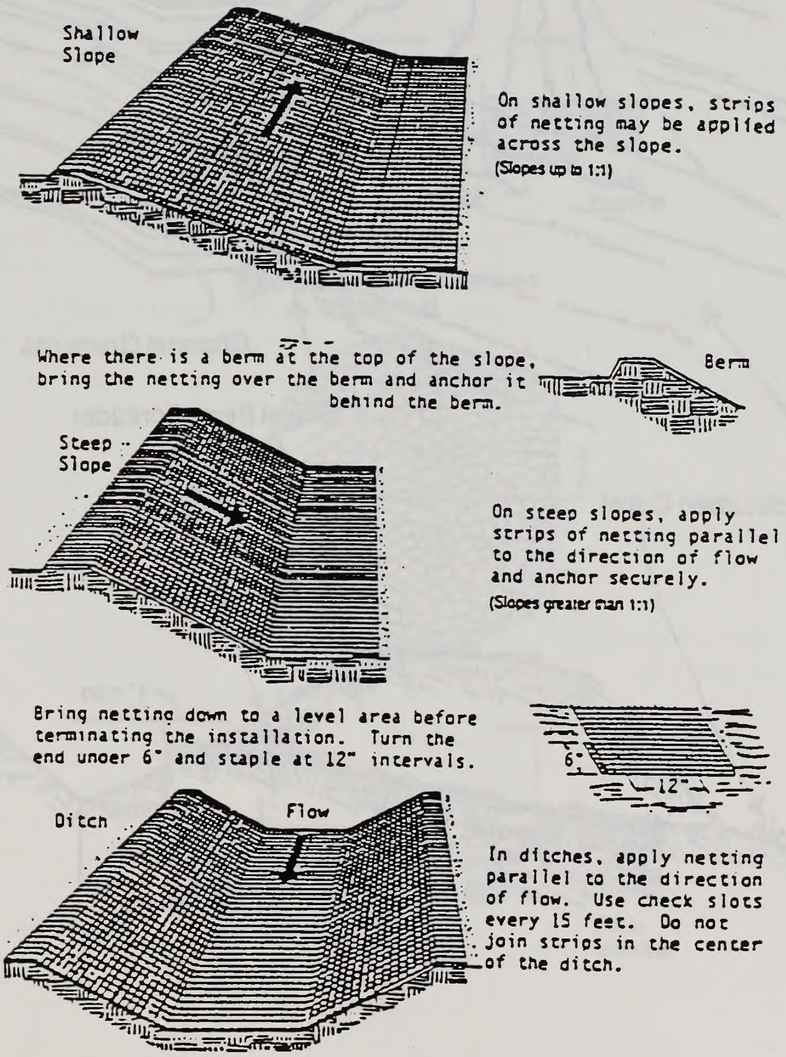

Shallow Slope
On shallow slopes, strips of netting may be applied across the slope.
(Slopes up to 1:1)
Where there is a berm at the top of the slope, bring the netting over the berm and anchor it behind the berm.
Berm
Steep Slope
On steep slopes, apply strips of netting parallel to the direction of flow and anchor securely.
(Slopes greater than 1:1)
Bring netting down to a level area before terminating the installation. Turn the end under 6" and staple at 12" intervals.
6"
12"
Ditch
Flow
In ditches, apply netting parallel to the direction of flow. Use check slots every 15 feet. Do not join strips in the center of the ditch.

Figure 2-13B: Orientation of Netting and Matting
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

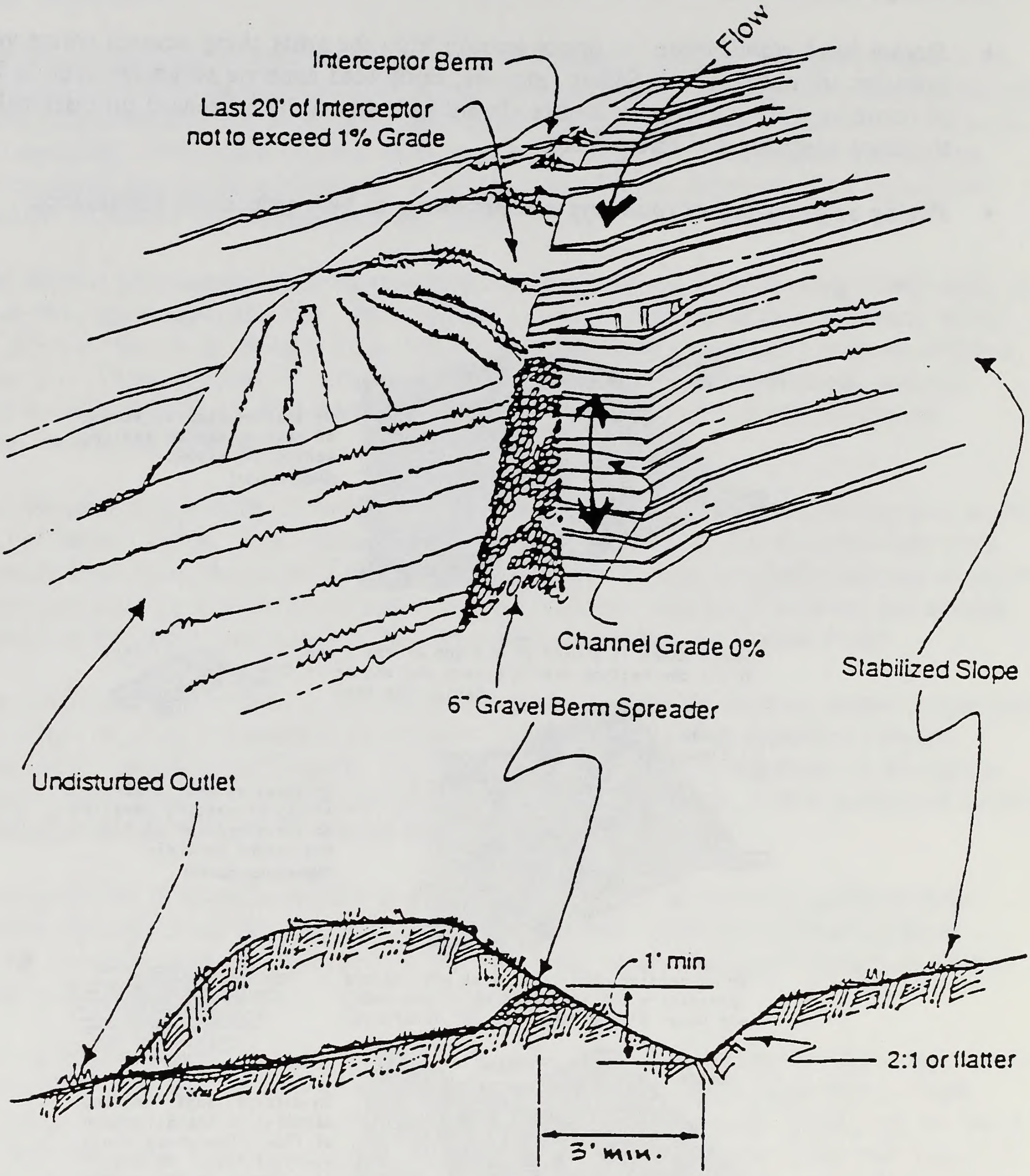
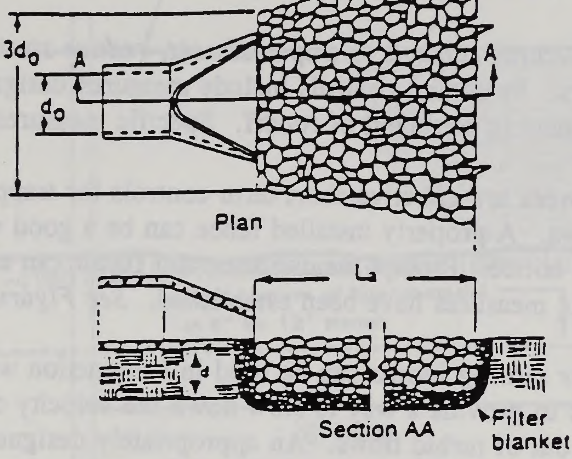


Figure 2-13C: Level Spreader
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

Pipe Outlet to Flat Area—
No Well-defined Channel



Pipe Outlet to Well-defined
Channel

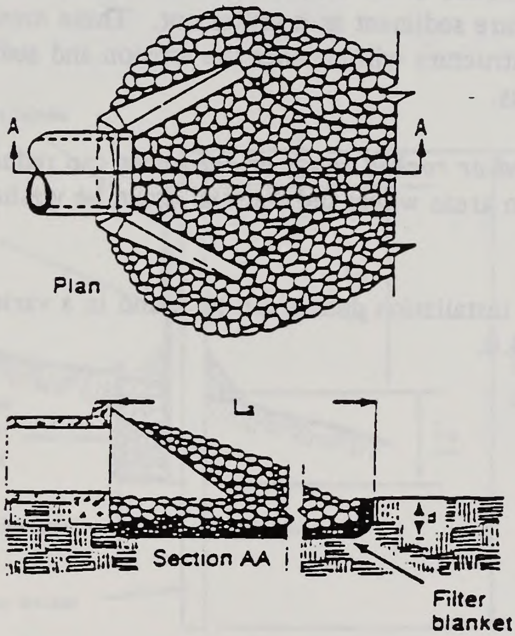


Figure 2-13D: Rock Outlet Protection
(Modified from U.S. Environmental Protection Agency, Storm Water Management for Industrial Activities, September 1992)

2.13.2 Sediment Control Practices

The following are recommended sediment control practices:

A. ***The use of vegetation to retard the velocity of sediment laden flows.*** Using vegetated swales or vegetated buffer strips to intercept runoff helps reduce the energy of the stream, allowing sediment to settle out and be captured by the vegetation.

B. ***The installation of structural controls to trap sediment, reduce stream energy, and allow for settling of turbid waters.*** Structural controls include measures designed to physically trap sediment or allow sediment to settle out of runoff. Specific measures include the following.

   - ***Filter fabric silt fences*** are effective short term controls for trapping sediment and filtering sediment laden flows. A properly installed fence can be a good way to provide some protection on short notice. Prompt maintenance and repair can extend the life span of fences until erosion control measures have been established. *See Figure 2-13E.*

   - ***Detention basins or settling basins*** can be used in conjunction with outlet protection, ditching and other measures to provide a way to slow down the velocity of a stream and allow the sediments to settle out of turbid flows. An appropriately designed outlet that filters the basin effluent is a very effective way to enhance the performance of such controls.

   - ***Check dams***, mentioned in the erosion control section, can be used to reduce channel velocities and capture sediment as it settles out. These must be designed and built with care to insure that the structure will enhance the erosion and sediment control and not create additional problems.

   - ***Constructing paved or rocked roads or entrances*** can reduce the amount of mud and sediment that is tracked onto areas where the material could be washed into the storm drainage system. *See Figure 2-13F.*

Additional information or installation details can be found in a variety of documents, some of which may be found in Section 4.0.

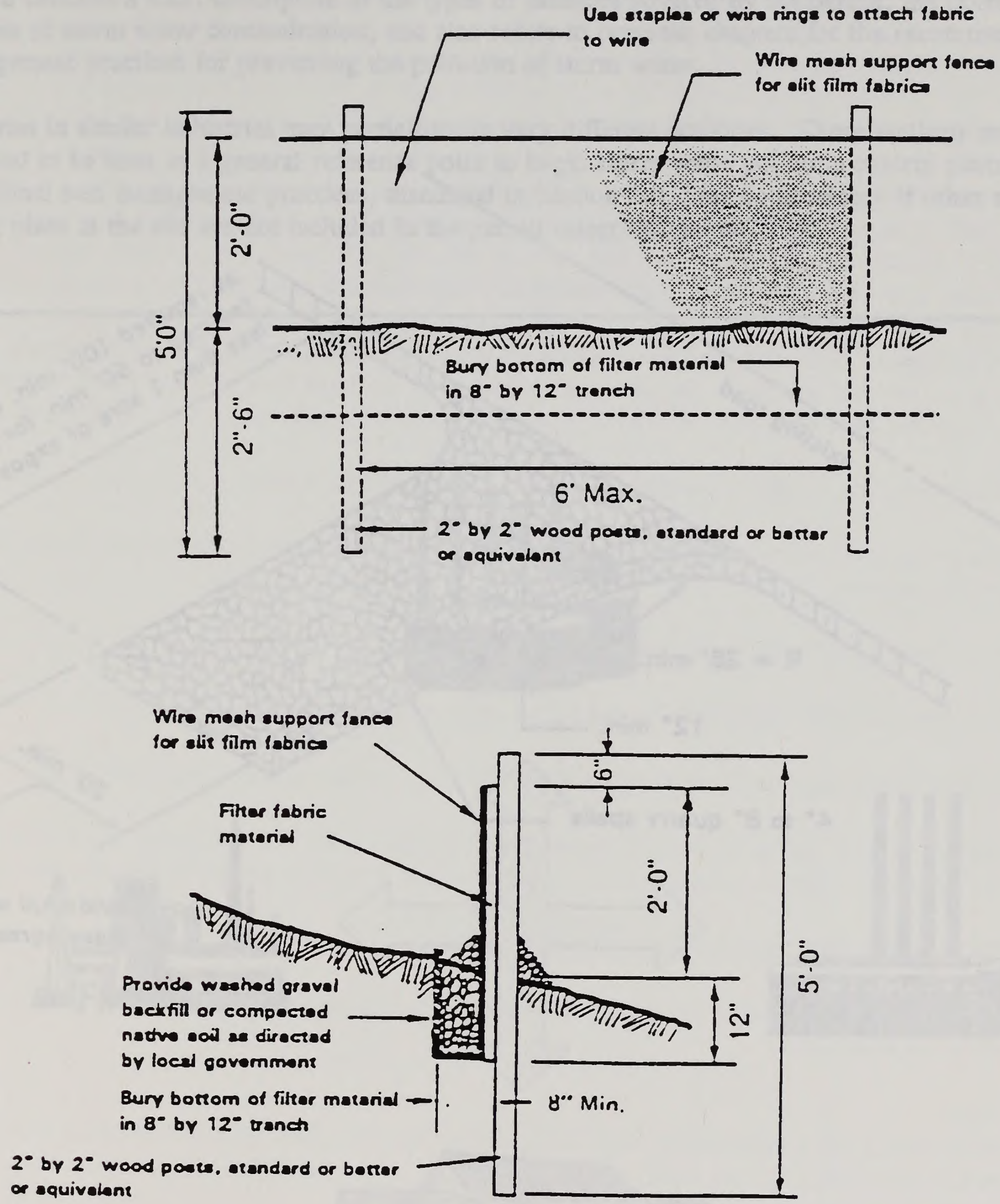

Filter fabric material in continuous rolls: Use staples or wire rings to attach fabric to wire
Wire mesh support fence for slit film fabrics
5'0"
2'-0"
2''-6"
Bury bottom of filter material in 8" by 12" trench
6' Max.
2" by 2" wood posts, standard or better or equivalent
Wire mesh support fence for slit film fabrics
Filter fabric material
6"
2'-0"
5'-0"
12"
Provide washed gravel backfill or compacted native soil as directed by local government
Bury bottom of filter material in 8" by 12" trench
8" Min.
2" by 2" wood posts, standard or better or equivalent

Figure 2-13E: Filter Fabric Silt Fence
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

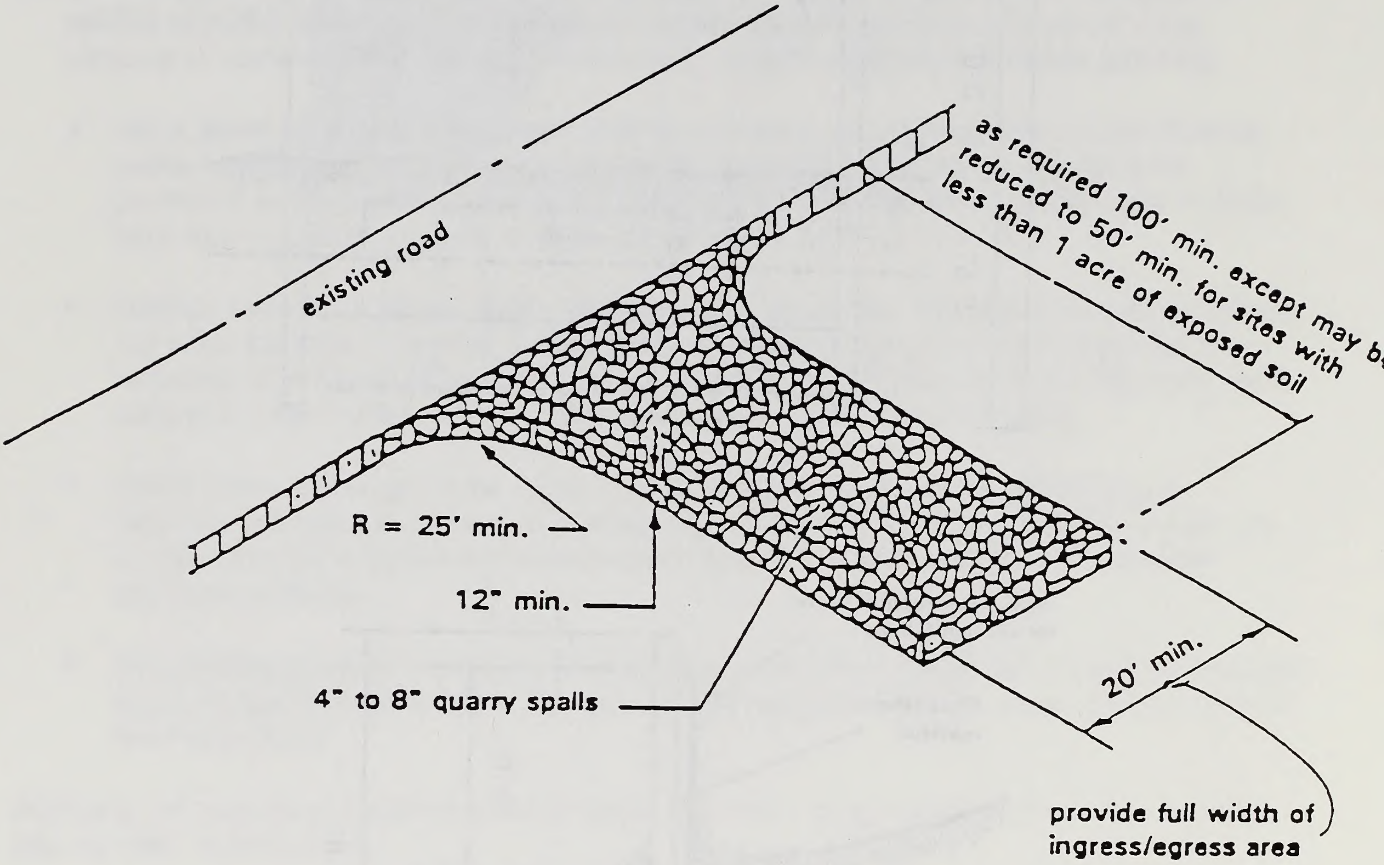
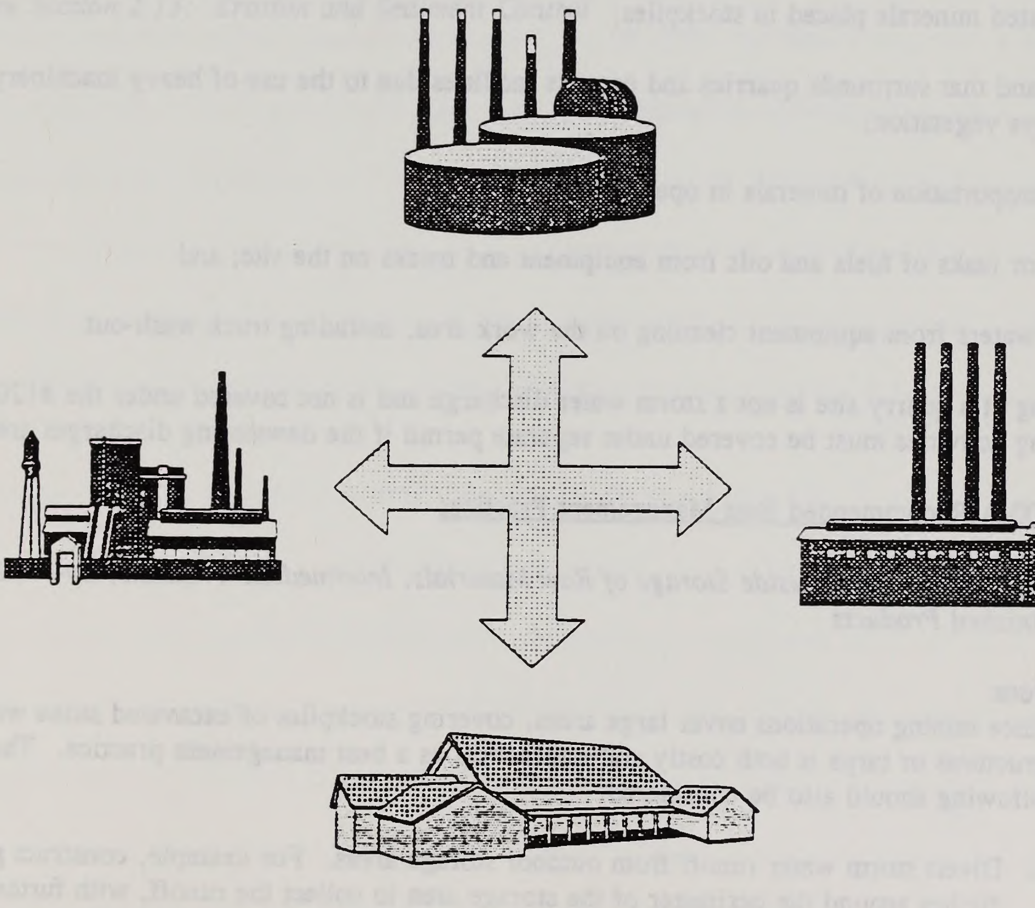


Figure 2-13F: Stabilized Construction Entrance
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

3.0 BEST MANAGEMENT PRACTICES BY NPDES PERMIT TYPE

The following sections correspond to the different National Pollutant Discharge Elimination System (NPDES) General Storm Water Discharge Permits issued to different industries in Oregon. Each section contains a short description of the types of facilities covered by the permit, the potential sources of storm water contamination, and also refers to previous chapters for the recommended best management practices for preventing the pollution of storm water.

Facilities in similar industries may participate in very different activities. These sections are only intended to be used as a general reference point to begin storm water pollution control planning. Additional best management practices, discussed in Section 2.0, may be necessary if other activities taking place at the site are not included in the permit categories below.



3.1 GENERAL NPDES PERMIT #1200-A

Industrial facilities covered under this permit include sand, gravel and other nonmetallic mineral quarrying and mining operations. These sites are generally described by Standard Industrial Classification (SIC) code Major Group 14, *Mining and Quarrying of Nonmetallic Minerals, Except Fuels*. Also covered by this permit are related activities at the site such as asphalt mix batch plants (SIC 2951), ready-mix concrete plants (SIC 3273), and vehicle maintenance facilities.

3.1.1 1200-A Potential Sources of Storm Water Contamination

Mineral mining operations often involve large surface areas, including the mine, the process facility locations, and access roads. Storm water can easily become contaminated after contact with these areas on the site, and the runoff may contain various minerals, silt, sand, clay, organic matter, fuels, oil and grease, and other suspended solids. Since raw materials are stockpiled for both ready mix concrete plants and asphalt mix batch plants, storm water runoff can easily become polluted on these sites. The spillage of mix water and the cleaning of the mixer truck chute at the ready mix concrete plant can also contaminate runoff. In summary, storm water at these sites can become contaminated by contact with the following:

1. excavated minerals placed in stockpiles;

2. bare land that surrounds quarries and process facilities due to the use of heavy machinery that destroys vegetation;

3. the transportation of minerals in open vehicles;

4. spills or leaks of fuels and oils from equipment and trucks on the site; and

5. wash waters from equipment cleaning on the work area, including truck wash-out.

Dewatering at a quarry site is not a storm water discharge and is not covered under the #1200-A. Dewatering activities must be covered under separate permit if the dewatering discharges are turbid.

3.1.2 1200-A Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*

  Note:
  Since mining operations cover large areas, covering stockpiles of excavated stone with roofed structures or tarps is both costly and impractical as a best management practice. The following should also be considered:

  A. Divert storm water runoff from outdoor storage areas. For example, construct grassed ditches around the perimeter of the storage area to collect the runoff, with further treatment (if needed) in a detention pond to remove pollutants prior to discharge to surface waters. The methods for collection and treatment of the runoff will depend on the particular pollutants detected through monitoring.

B. Segregate the operations or processes that will produce the most significant source of pollutants on the site. Once this determination has been made, it may be possible to divert storm water runoff from these areas to prevent contamination.

C. Place covers over vehicles transporting materials either for processing or from the site. For example, trucks used to haul minerals from the mine to the processing area should have covered beds to prevent storm water contact with the minerals. Covering would also apply to train cars and other transportation options.

- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.17: Fueling Stations*
- *See Section 2.11: Inspection and Maintenance of Storm Drainage Facilities*
- *See Section 2.13: Erosion and Sediment Control*

3.2 GENERAL NPDES PERMIT #1200-D

Industrial activities covered under this permit include textile and apparel manufacturing, printing, and warehousing facilities. Textile and apparel manufacturing facilities are described by Standard Industrial Classification (SIC) Code Major Group 22, *Textile Mill Products*, and SIC Code Major Group 23, *Apparel and Other Finished Products Made From Fabrics and Similar Materials*. Printing activities are covered by SIC Major Group 27, *Printing, Publishing, and Allied Industries*, and warehousing facilities are covered by SIC Major Group 42, *Motor Freight Transportation and Warehousing*.

3.2.1 1200-D Potential Sources of Storm Water Contamination

Under the permitting program, industrial facilities within this classification are required to obtain a storm water discharge permit if storm water runoff is exposed to raw materials, material handling equipment or activities, intermediate products, final products, waste materials, by-products, or industrial machinery. Storm water discharges can become contaminated by contact with:

1. outside storage or spillage of raw materials, chemicals, and wastes produced from the various processes;

2. vehicle or equipment washing activities;

3. fueling and vehicle maintenance areas;

4. shipping and receiving areas; and

5. material handling activities and equipment.

3.2.2 1200-D Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*

- *See Section 2.2: Outside Container Storage and Waste Disposal*

- *See Section 2.3: Loading and Unloading Materials*

- *See Section 2.4: Emergency Spill Response and Cleanup Plans*

- *See Section 2.8: Vehicle and Equipment Washing*

- *See Section 2.9: Vehicle and Equipment Maintenance*

- *See Section 2.10: Fueling Stations*

- *See Section 2.11: Inspection and Monitoring Activities*

3.3 GENERAL NPDES PERMIT #1200-F

Industrial facilities covered under this permit include food processing establishments, such as meat products; dairy products; canned, frozen, and preserved fruits, vegetables, and food specialties; grain mill products; bakery products; sugar and confectionery products; fats and oils; beverages; and miscellaneous food preparations. These types of facilities are assigned Standard Industrial Classification (SIC) Major Group 20, *Food and Kindred Products.*

3.3.1 1200-F Potential Sources of Storm Water Contamination

Under the permitting program, industrial facilities within this classification are required to obtain a storm water discharge permit if storm water runoff is exposed to raw materials, material handling equipment or activities, intermediate products, final products, waste materials, by-products, or industrial machinery.

The following activities serve as examples of ways in which storm water discharges can become contaminated by contact with:

1. animals, including their feeding areas and waste discharges;
2. chemicals or preservatives, if stored outdoors;
3. the transportation of raw or intermediate materials or products to or from the site;
4. raw vegetables and fruits; and
5. vehicle or equipment washing activities, such as cleaning dairy tanks or trucks.

3.3.3 1200-F Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Maintenance of Storm Drainage Facilities*

3.4 GENERAL NPDES PERMIT #1200-G

Industrial facilities covered under this permit include landfills and open dumps, as well as associated activities ongoing at these sites such as leachate treatment and disposal facilities, waste container staging areas, soil stockpiling areas, and vehicle maintenance facilities.

3.4.1 1200-G Potential Sources of Storm Water Contamination

Storm water can become contaminated by contact with the following:

1. exposed materials and parts that may be covered with oil, grease, chemicals, metals, bacteria or other pollutants;

2. materials that have been spilled or have leaked, such as oil, grease, gasoline, antifreeze, etc.

3. eroded soil exposed due to the activity of heavy machinery on the site, and burying and covering waste materials;

4. waste stockpiles;

5. waste materials as they are transported to and from the site;

6. process wastewaters resulting from cleaning of parts or waste materials; and

7. wash waters resulting from cleaning vehicles, storage containers, etc.

3.4.2 1200-G Recommended Best Management Practices

See Section 2.2: Outside Container Storage and Waste Disposal

See Section 2.3: Loading and Unloading Materials

See Section 2.4: Emergency Spill Response and Cleanup Plans

See Section 2.5: Above-Ground Tank Storage

See Section 2.7: Fueling Stations

See Section 2.8: Vehicle and Equipment Washing

See Section 2.9: Vehicle and Equipment Maintenance

See Section 2.11: Inspection and Monitoring Activities

See Section 2.12: Dust Control

See Section 2.13: Erosion and Sediment Control

3.5 GENERAL NPDES PERMIT #1200-H

Industrial activities covered under this permit include chemical manufacturing, petroleum refining, rubber manufacturing, leather tanning, stone, clay, glass, and concrete products, the primary metals industry, and steam electric power generation, including coal and hogged fuel handling sites.

The manufacturing of chemicals and related products is described by Standard Industrial Classification (SIC) Code Major Group 28. SIC Code Major Group 29 includes the petroleum refining industry, along with related activities. SIC Code Major Group 30 includes rubber and miscellaneous plastics products. Leather and leather products are covered in SIC Code Major Group 31. The production of stone, clay, glass, and concrete products are included in SIC Code Major Group 32. The primary metals industry is classified in SIC Code Major Group 33. Steam electric power generation is covered in SIC Code Major Group 49. Asphalt batch plants (SIC 2951) and concrete batch plants (SIC 3273) are covered under the 1200-A permit.

3.5.1 1200-H Potential Sources of Storm Water Contamination

Industries covered under the General Storm Water Permit #1200-H generally consist of large manufacturing areas with most of the activities taking place under cover. However, storm water can become contaminated in various ways by contact with the following:

1. raw materials, spilled and leaking significant materials, intermediate products, or by-products either found or produced on the plant site;
2. raw or intermediate products being transported to or from the site;
3. material handling areas;
4. treatment areas for process wastewaters;
5. refuse areas; and
6. shipping and receiving areas.

3.5.2 1200-H Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.6: Outside Manufacturing Activity*

3.5.2 1200-H Recommended Best Management Practices *continued*

- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.10: Sandblasting and Painting Operations*
- *See Section 2.11: Inspection and Monitoring Activities*
- *See Section 2.13: Erosion and Sediment Control*

3.6 GENERAL NPDES PERMIT #1200-L

Industrial facilities covered under this permit are involved in light industrial activities and include metal fabrication, manufacturing of different types of equipment, and ship and boat building and repair.

The manufacturing of fabricated metals (except machinery and transportation equipment) is covered in SIC Code Major Group 34. SIC Code Major Group 35 includes the manufacture of industrial and commercial machinery and equipment and computers. The manufacturing of electronic and electrical equipment (except computer equipment) for the generation, storage, transmission, and utilization of electrical energy is covered in SIC Code 36. SIC Code Major Group 37 includes the manufacture of transportation equipment for carrying passengers and cargo by land, air, and water. The manufacture of measuring, analyzing, and controlling instruments, photographic, medical, and optical equipment, and watches and clocks is covered in SIC Code Major Group 38. Miscellaneous manufacturing industries are covered in SIC Code 39.

3.6.1 1200-L Potential Sources of Storm Water Contamination

Industries covered under the General Storm Water Permit #1200-L generally consist of large manufacturing areas with most of the activities taking place under cover. However, storm water can become contaminated by contact with the following:

1. raw materials, spilled and leaking significant materials, intermediate products, or by-products either stored or produced on the plant site;
2. the transportation of raw or intermediate products to or from the site;
3. material handling areas;
4. treatment areas for process wastewaters;
5. refuse areas; and
6. shipping and receiving areas.

3.6.2 1200-L Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*

3.6.2 1200-L Recommended Best Management Practices

- *See Section 2.6: Outside Manufacturing Activity*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Monitoring Activities*

3.7 GENERAL NPDES PERMIT #1200-M

Industrial facilities covered under this permit include mineral extraction facilities, including metal mining, coal mining, and oil and gas extraction activities.

Metal mining is covered by Standard Industrial Classification (SIC) Major Group 10. The coal mining industry is included in SIC Code 12. While coal mines currently operate in 26 states, no coal mining activities occur in Oregon. Oil and gas extraction activities are covered in SIC Code 13.

3.7.1 1200-M Potential Sources of Storm Water Contamination

According to the Federal storm water regulations, the activities designated by SIC Codes 10 through 14 are required to obtain permits if storm water discharges from the site have become contaminated by contact with any overburden, raw material, intermediate products, finished products, byproducts, or waste products located on the site of the operations. As the regulations indicate, storm water can be contaminated by contact with the following:

1. excavated raw materials or wastes placed in stockpiles;
2. process treatment systems, such as settling or tailings ponds;
3. exposed soil susceptible to erosion that surrounds the mine and process facilities due to the use of heavy machinery that destroys vegetation, or as found on haul roads;
4. the transportation of substances in open vehicles, including railcars;
5. the discharge of oils and solvents from processing equipment on the site; and
6. wash waters from equipment cleaning in the work area.

3.7.2 1200-M Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*

  Note:
  Since mining operations cover large areas, covering stockpiles of excavated stone with roofed structures or tarps is both costly and impractical as a best management practices. The following should also be considered:

  A. Divert storm water runoff from outdoor storage areas. For example, construct grassed ditches around the perimeter of the storage area to collect the runoff, with further treatment (if needed) in a detention pond to remove pollutants prior to discharge to surface waters. The methods for collection and treatment of the runoff will depend on the particular pollutants detected through monitoring.

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products (continued)*

  B. Segregate the operations or processes that will produce the most significant source of pollutants on the site. Once this determination has been made, it may be possible to divert storm water runoff from these areas to prevent contamination.

  C. Place covers over vehicles transporting materials either for processing or from the site. For example, trucks used to haul minerals from the mine to the processing area should have covered beds to prevent storm water contact with the minerals. Covering would also apply to rail cars, or other transportation options.

- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Maintenance of Storm Drainage Facilities*
- *See Section 2.13: Erosion and Sedimentation Control*

3.8 GENERAL NPDES PERMIT #1200-P

The pulp and paper industry, as designated in Standard Industrial Classification (SIC) Code 26, *Paper and Allied Products*, is covered under this permit, along with related activities that may be ongoing at the site, such as woodwaste landfills, chip and hogged fuel storage, truck and equipment repair, power generation, and bulk petroleum storage.

3.8.1 1200-P Potential Sources of Storm Water Contamination

Industries covered under the 1200-P generally consist of large manufacturing sites with areas for wood storage, processing, treatment, and waste disposal. Storm water at these sites can become contaminated by contact with the following:

1. raw materials, spilled or leaking significant materials, intermediate products, or by-products either found or produced on the plant site;
2. the transportation of raw materials or intermediate products to or from the site;
3. dusts and wood fines from storage and processing areas;
4. material handling areas;
5. treatment areas for process wastewaters and sludge disposal;
6. refuse areas;
7. repair activities, including painting and sandblasting;
8. bare land susceptible to erosion that may surround raw material storage areas; and
9. shipping and receiving areas.

3.8.2 1200-P Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.6: Outside Manufacturing Activity*
- *See Section 2.7: Fueling Stations*

3.8.2 1200-P Recommended Best Management Practices *continued*

- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.10: Sandblasting and Painting Operations*
- *See Section 2.11: Inspection and Monitoring Activities*
- *See Section 2.12: Dust Control*
- *See Section 2.13: Erosion Control*

3.9 GENERAL NPDES PERMIT #1200-R

This permit covers metal scrapyards, battery reclaimers, automobile wrecking yards, and salvage yards classified under Standard Industrial Classification (SIC) Code 5015, *Motor Vehicle Parts, Used,* and SIC Code 5093, *Scrap and Waste Materials.* Hazardous waste treatment, storage, and/or disposal facilities are also covered by this permit.

3.9.1 1200-R Potential Sources of Storm Water Contamination

The facilities covered under the 1200-R usually occupy large areas of land. Generally the activities ongoing at these sites, such as the separation of vehicle parts and the stockpiling of waste (scrap) materials are outdoor activities. Storm water runoff can become contaminated by contact with:

1. exposed automobile parts that may be covered with oil or grease;
2. spills of oil, grease, gasoline, antifreeze, brake fluids, or various chemicals and metals that may be found at the waste site;
3. waters from cleaning activities;
4. repair activities, including painting and sandblasting;
5. eroded soil exposed due to the activity of heavy machinery on the site;
6. waste stockpiles;
7. waste materials as they are transported to and from the site; and
8. process wastewaters from treatment activities.

3.9.2 1200-R Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.6: Outside Manufacturing Activity*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*

3.9.2 1200-R Recommended Best Management Practices *continued*

- *See Section 2.10: Sandblasting and Painting Operations*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Monitoring Activities*
- *See Section 2.12: Dust Control*
- *See Section 2.13: Erosion Control*

3.10 GENERAL NPDES PERMIT #1200-S

This permit covers wastewater treatment facilities with a design flow of one million gallons per day (mgd) treating domestic sewage or sludge, treatment plants required to have an approved pretreatment program, and wastewater treatment devices or systems used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage with a design flow of one mgd. Also included are lands dedicated to the disposal of sewage sludge that are located within the confines of such facilities.

3.10.1 1200-S Potential Sources of Storm Water Contamination

Domestic wastewater treatment plants usually cover large areas and consist of various treatment units and processes that may or may not be covered, storage tanks, control buildings, paved surfaces, and grassed areas. The local public works department may also locate additional facilities for vehicle maintenance on the plant site.

Storm water runoff reaching the treatment plant site can become contaminated in various ways. The primary cause of storm water contamination will probably result from contact with the following:

1. spills of materials including domestic waste, such as raw sewage, sludge, and septage; chemicals such as alum and chlorine, used in treatment processes; and industrial wastes that may have a high content in metals, acids, or other toxic substances;

2. oil and grease drippings and spilled fuel from vehicle maintenance areas;

3. leaks from containers, gaskets, and pipes; and
4. wash waters from cleaning activities.

3.10.2 1200-S Recommended Best Management Practices

- *See Section 2.1: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.8: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Monitoring Activities*

- *Treatment of Contaminated Storm Water*

  Regarding the treatment of storm water runoff from the sewage treatment plant site, it is the Department's policy that only storm water runoff exposed to areas such as the sludge truck loadout or the grit removal containers should be routed back into the plant headworks for treatment. Prior to re-routing storm water, contact the DEQ inspector assigned to the facility to approve the change.

  Connections from drainage sub-basins on the plant site into the plant headworks would be appropriate for areas where runoff is regularly contaminated or exposed to spills or overflows. Storm water runoff not contaminated in this manner should not be routed into the treatment plant. Other means of treating the contaminated runoff should be considered.

3.11 GENERAL NPDES PERMIT #1200-T

Transportation and bulk petroleum facilities having on-site vehicle maintenance shops that perform vehicle maintenance (rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or deicing operations are covered in this general permit.

These activities are classified in Standard Industrial Classification (SIC) Major Group Codes 40, *Railroad Transportation*; 41, *Local and Interurban Passenger Transport*; 42, *Trucking and Warehousing* (except 4221-25, warehousing facilities covered in the 1200-D permit); 43, *U.S. Postal Service*; 44, *Water Transportation*; 45, *Transportation by Air*; and 5171, *Petroleum Bulk Stations & Terminals*.

3.11.1 1200-T Potential Sources of Storm Water Contamination

As noted in the federal regulations (40 CFR Title 122.26), vehicle maintenance shops, equipment cleaning operations, and airport deicing operations are considered to be industrial activities related to transportation that may contaminate storm water runoff and necessitate coverage under the General Storm Water Permitting Program.

With these ongoing activities, storm water can become contaminated in various ways, including by contact with the following:

1. spilled fuel or oil and grease drippings from fueling trucks left on paved surfaces;
2. raw materials, such as stockpiles of coal, ores, limestone, sand, and gravel, that may be stored on docks or railroad yards prior to loading;
3. wash waters from cleaning activities for vehicles, vessels, containers, tanks and pipelines used in loading, or imported automobiles;
4. spilled liquids from transfer operations;
5. outdoor maintenance activities; and
6. dust and fines from dry cleaning of trucks, box cars, and cargo areas.

3.11.2 1200-T Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*
- *See Section 2.2: Outside Container Storage and Waste Disposal*
- *See Section 2.3: Loading and Unloading Materials*
- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*

3.11.2 1200-T Recommended Best Management Practices *continued*

- *See Section 2.6: Outside Manufacturing Activity*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.10: Sandblasting and Painting Operations*
- *See Section 2.11: Inspection and Monitoring Activities*

3.12 GENERAL NPDES PERMIT #1200-W

This permit covers wood products manufacturing and related activities defined in Standard Industrial Classification (SIC) Codes 24, *Lumber and Wood Products (except Furniture)*, and 25, *Furniture and Fixtures*. This includes sawmills, planer mills, millwork, and production of veneer, plywood, particle board, and hardboard, along with the dry kilns, log decks, woodwaste landfills, chip and hogged fuel storage, truck and equipment repair, power generation, and other associated activities ongoing at the site. In addition, manufacturing activities are covered by the permit, including the manufacture of household, office, public building, and restaurant furniture, and office and store fixtures.

Excluded from coverage under this permit are wood preserving facilities as defined in SIC Code 2491. Facilities with this code are required to apply for individual NPDES permit for storm water discharges. Harvesting or reforestation activities are also excluded from the 1200-W. See 40 CFR 122.27 for the list of silvicultural activities exempt from NPDES permit.

3.12.1 1200-W Potential Sources of Storm Water Contamination

Industries covered under the 1200-W generally consist of large manufacturing sites with areas for wood storage, processing, treatment of wastes, and waste disposal. Storm water can become contaminated by contact with the following:

1. raw materials; spilled or leaking significant materials; by-products either used or produced on the plant site such as log decks, fractionalized wood piles, bark piles, and sawdust; dip vats for staining compounds; or adhesives;

2. the transportation of raw materials or intermediate products to or from the site;

3. sawdust and wood fines from storage and processing areas;

4. material handling areas;

5. treatment areas for process wastewaters;

6. refuse areas (waste piles);

7. bare land susceptible to erosion, including unpaved roads or areas used for material storage; and

8. shipping and receiving areas where stains, glues, bleaches, or dyes may be unloaded on the site.

3.12.2 1200-W Recommended Best Management Practices

- *See Section 2.1: Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products*

- *See Section 2.2: Outside Container Storage and Waste Disposal*

- *See Section 2.3: Loading and Unloading Materials*

3.12.2 1200-W Recommended Best Management Practices *continued*

- *See Section 2.4: Emergency Spill Response and Cleanup Plans*
- *See Section 2.5: Above-Ground Tank Storage*
- *See Section 2.6: Outside Manufacturing Activity*
- *See Section 2.7: Fueling Stations*
- *See Section 2.8: Vehicle and Equipment Washing*
- *See Section 2.9: Vehicle and Equipment Maintenance*
- *See Section 2.11: Inspection and Monitoring Activities*
- *See Section 2.12: Dust Control*
- *See Section 2.13: Erosion Control*

4.0 ADDITIONAL RESOURCES

4.1 DOCUMENT LIST

- Code of Federal Regulations (CFR), Title 40-Protection of Environment, Parts 122, 123, 124, and Title 33, Parts 153, 154, and 155.
  ** Sections of rule available from National Storm Water Hotline (703) 821-4823.*

- Draft Surface Mining Reclamation Guide, Washington State Department of Natural Resources, WA, July 1992.

- Erosion Control Plans Technical Guidance Handbook, City of Portland, OR, January 1991
  ** Available from City of Portland (503) 796-7303.*

- Erosion Control Plans Technical Guidance Handbook, Unified Sewerage Agency, OR, January 1991.
  ** Available from USA (503) 648-8621.*

- Erosion/Sedimentation Control Plan Technical Guidance Handbook, Clackamas County, OR, August 1991.
  ** Available from Clackamas County (503) 655-8521.*

- Stormwater Program Guidance Manual for the Puget Sound Basin, Volumes 1 & 2, Publication #92-32 and #92-33, Washington Department of Ecology, WA, July 1992.
  ** Available for fee from WA DOE (206) 438-7528.*

- Stormwater Management Manual for the Puget Sound Basin (The Technical Manual), Publication #91-75, Washington Department of Ecology, WA, February 1992.
  ** Available for fee from WA DOE (206) 438-7528.*

- Storm Water Management for Industrial Activities, U.S. Environmental Protection Agency (EPA), April 1992.
  ** Available for fee from Education Resource Information Center/Clearinghouse (614) 292-6717, order #447N. Summary available from National Storm Water Hotline (703) 821-4823.*

- Storm Water Management for Construction Activities, U.S. Environmental Protection Agency (EPA), April 1992.
  ** Available for fee from Education Resource Information Center/Clearinghouse (614) 292-6717, order #482N. Summary available from National Storm Water Hotline (703) 821-4823.*

- Water Quality Best Management Practices Manual for Commercial and Industrial Businesses, City of Seattle, WA, June 1989.

4.2 DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ) CONTACTS

Please see the table of DEQ Locations, Table 4-1A, for the address and phone number for the regional office serving your county.

4.3 OTHER AGENCIES

- Environmental Protection Agency (EPA):

  Chlorofluorocarbons (CFC) Removal and Recycling Information 1-800-296-1996

  Oregon Operations Office (503) 326-3250

  Region 10 Storm Water Program (206) 553-8399

  Spill Prevention Countermeasure and Control 1-800-424-4EPA

- Washington Department of Ecology (WA DOE):

  Industrial Storm Water Program (206) 438-7614

  Municipal Storm Water Program (206) 438-7076

DEQ OFFICE LOCATIONS

OFFICE	PHONE #	ADDRESS
Headquarters	(503) 229-5256 or 1-800-452-4011 (in Oregon)	811 SW Sixth Ave Portland, OR 97204-1390
Central Region Counties: Crook, Deschutes, Harney, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco.	(503) 388-6146	2146 NE 4th, Suite 104 Bend, OR 97701
Eastern Region Counties: Baker, Gilliam, Grant, Malheur, Morrow, Umatilla, Union, Wallowa, Wheeler.	(503) 276-4063	700 SE Emigrant, Suite 330 Pendleton, OR 97801
Northwest Region Counties: Clackamas, Clatsop, Columbia, Multnomah, Tillamook, Washington.	(503) 229-5263	1500 SW 1st Ave., Suite 750 Portland, OR 97201-5884
Southwest Region Counties: Coos, Curry, Douglas, Jackson, Josephine.	(503) 776-6010	201 W Main St., Suite 2D Medford, OR 97501
Willamette Valley Region Counties: Benton, Lane, Lincoln, Linn, Marion, Polk, Yamhill.	(503) 378-8240	750 Front St. NE, Suite 120 Salem, OR 97310

Table 4-1A: DEQ Locations

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

HD 243 .07 C66 1995
U. S. Bureau of Land
Management. Coos Bay
Draft environmental impact
statement for the

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DENVER, CO 80225